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DRYWELL VAN IN-TANK LIQUID OBSERVATION WELL SURVEILLANCE DATA INTERPRETATION

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Abstract

The Drywell Van Surveillance System for in-tank monitoring of Liquid Observation Wells (LOWs) is described. The gamma, neutron, and acoustic probes used to obtain data are explained and their operating characteristics analyzed. The tanks containing LOWs are grouped according to similarities and the profiles of each type are interpreted. Interstitial Liquid Levels are assigned to all 58 tanks and a measurement methodology is recommended. Examples of data analysis are provided.

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ACKNOWLEDGMENTS

During Liquid Observation Well (LOW) monitoring development, many individual contributors and organizations have provided significant effort. As the system now becomes fully operational, the results of these efforts to yield a definitive monitoring system are intrinsically incorporated in portions of this document. As with any newly operational system of this magnitude, experience and time are expected to be the validating parameters which perhaps will provide a more comprehensive acknowledgement than can be given here.

Thanks is extended to C. M. Towne for sorting and classifying tank scan data and for such editing as time permitted; to D. W. Fukumoto for assistance in tank history development and liaison support; and to M. E. Smith for her ability to always "Handle-It."

1.0 INTRODUCTION

This report, in conjunction with References 2 and 3, demonstrates a basis for interpreting LOW data scans in the present state of this technology.

The context of this report is largely empirical and the presentation is limited to examples provided by existing equipment and processing means. The report does assume that the relatively minor processing aids suggested in the data and appendix will ultimately be available to the user.

Liquid Observation Well data acquisition is accomplished by drywell van logging systems using acoustic, gamma, and neutron detection probes. A functional description of these logging systems and their data characteristics is provided. A thorough understanding of the nature of the data is offered, together with an investigative methodology. To this end, a number of examples, selected mostly by random choice, have been prepared in Appendix A to illustrate the measurement techniques that can and have been used to assess the condition of a tank's contents and to establish an integrated Interstitial Liquid Level (ILL) within saltcake.

By no means is it a valid assumption that this document will cover all the possibilities that will exist. Therefore, the methodology presented here should be considered a living implementation, to be improved by mutual agreement at every opportunity.

2.0 DRYWELL VAN LOW LOGGING SYSTEM

The drywell van LOW logging system is an extension of the vertical drywell logging system, long used for waste storage tank leak surveillance(1). The parent system monitors vertical drywells located external to waste storage tanks. The monitored parameters have been gamma radiation intensity and soil moisture content. Numerous upgrades have extended the system's capabilities such that internal tank surveillance of the saltcake ILL has been achieved. The LOW monitoring is accomplished by means of acoustic, gamma, and neutron detection probes, scanning within a 3 inch inside diameter (ID) fiberglass drywell located within the monitored tank.

The operation of the drywell van is computer automated. Figures 2.1 and 2.2 provide a diagram of the operating sequence.

System operation begins with probe validation and depth calibration and then proceeds with introduction of the LOW scan control information into the computer. Introduction of this information is accomplished by means of thumb wheel coding switches. The scan control problem is then solved by the computer using the operator input variables, stored data, and arithmetic to determine various parameters, including the probe insertion depth, detector offset, data interval, and probe speed (see Figure 2.3).

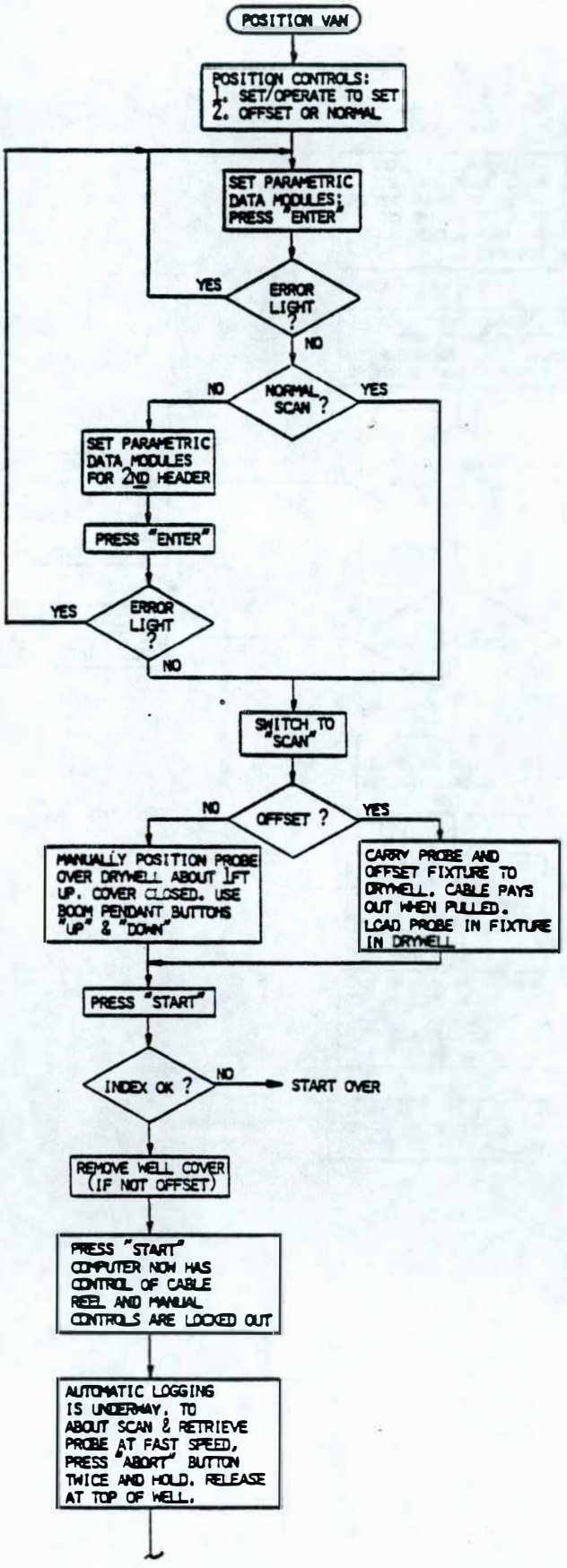

POSITION VAN
POSITION CONTROLS:
1. SET/OPERATE TO SET
2. OFFSET OR NORMAL
SET PARAMETRIC DATA MODULES; PRESS "ENTER"
ERROR LIGHT ?
YES
NO
NORMAL SCAN ?
NO
YES
SET PARAMETRIC DATA MODULES FOR 2ND HEADER
PRESS "ENTER"
ERROR LIGHT ?
YES
NO
SWITCH TO "SCAN"
OFFSET ?
NO
YES
MANUALLY POSITION PROBE OVER DRYWELL ABOUT 1FT UP. COVER CLOSED. USE BOOM PENDANT BUTTONS "UP" & "DOWN"
CARRY PROBE AND OFFSET FIXTURE TO DRYWELL. CABLE PAYS OUT WHEN PULLED. LOAD PROBE IN FIXTURE IN DRYWELL
PRESS "START"
INDEX OK ?
NO
START OVER
REMOVE WELL COVER (IF NOT OFFSET)
PRESS "START" COMPUTER NOW HAS CONTROL OF CABLE REEL AND MANUAL CONTROLS ARE LOCKED OUT
AUTOMATIC LOGGING IS UNDERWAY. TO ABOUT SCAN & RETRIEVE PROBE AT FAST SPEED, PRESS "ABORT" BUTTON TWICE AND HOLD. RELEASE AT TOP OF WELL.

FIGURE 2.1

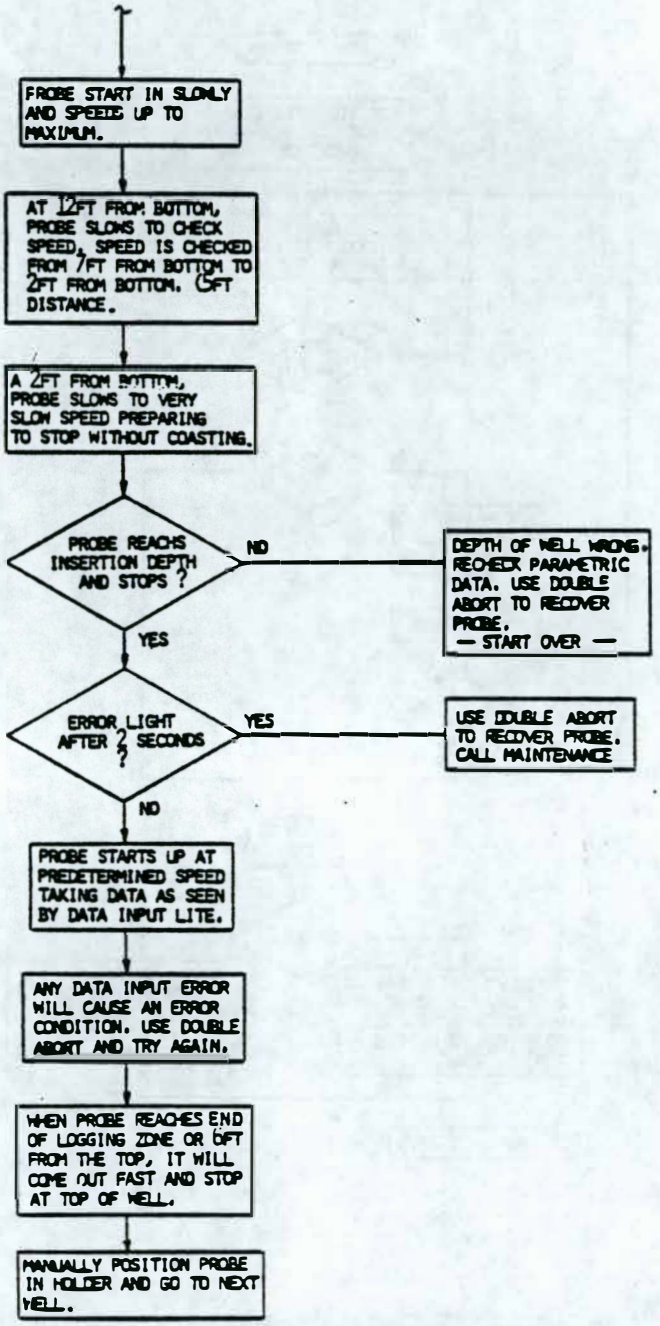
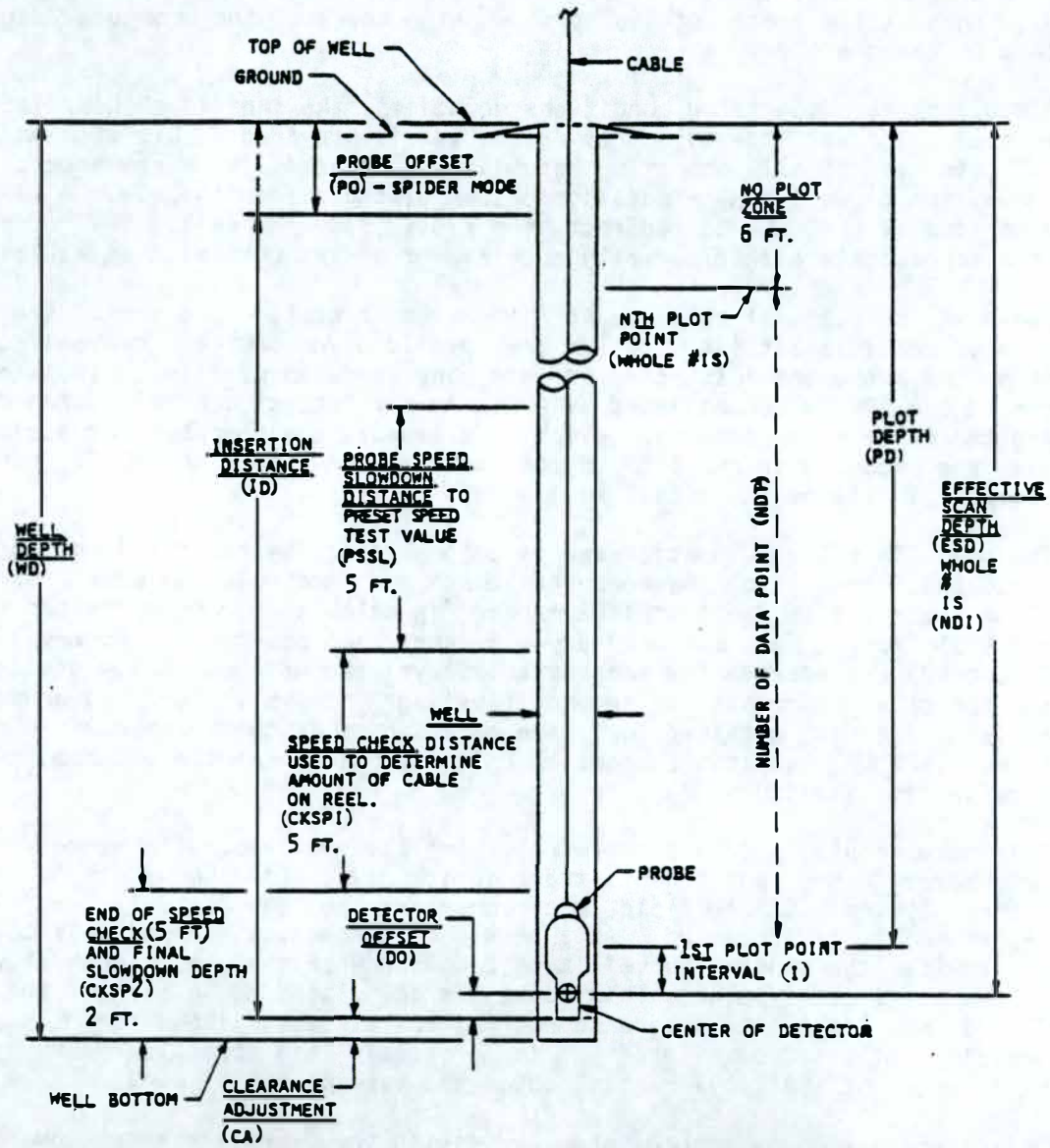

PROBE START IN SLOWLY AND SPEEDS UP TO MAXIMUM.
AT 12FT FROM BOTTOM, PROBE SLOWS TO CHECK SPEED, SPEED IS CHECKED FROM 7FT FROM BOTTOM TO 2FT FROM BOTTOM. 5FT DISTANCE.
A 2FT FROM BOTTOM, PROBE SLOWS TO VERY SLOW SPEED PREPARING TO STOP WITHOUT COASTING.
PROBE REACHS INSERTION DEPTH AND STOPS ?
NO
DEPTH OF WELL WRONG. RECHECK PARAMETRIC DATA. USE DOUBLE ABORT TO RECOVER PROBE. — START OVER —
YES
ERROR LIGHT AFTER 2 SECONDS ?
YES
USE DOUBLE ABORT TO RECOVER PROBE. CALL MAINTENANCE
NO
PROBE STARTS UP AT PREDETERMINED SPEED TAKING DATA AS SEEN BY DATA INPUT LITE.
ANY DATA INPUT ERROR WILL CAUSE AN ERROR CONDITION. USE DOUBLE ABORT AND TRY AGAIN.
WHEN PROBE REACHES END OF LOGGING ZONE OR 6FT FROM THE TOP, IT WILL COME OUT FAST AND STOP AT TOP OF WELL.
MANUALLY POSITION PROBE IN HOLDER AND GO TO NEXT WELL.

FIGURE 2.2

WELL PARAMETER PICTORIAL
MNEMONICS ARE IN (-)



EQUATIONS:

ESD = WD - DO - CA
PD = ESD - I
ID = WD - CA - PO
NDP = NDI - NPZI
CKSP2 = ID - 2 FT
CKSP1 = CKSP2 - 5 FT
PSSL = CKSP1 - 5 FT

NOTES: PLOT DEPTH IS TRANSMITTED TO ECLIPSE IN HEADER FORMAT ALSO, NO. OF DATA SETS SENT WILL = NDP (ABOVE).

GENERAL PROCEDURE:

1. GET WD
2. GET DO
3. SOLVE FOR ESD
   (LET CA = Ø)
   ESD = WD - DO
4. GET I
5. FIND CA:
   $\frac{ESD}{I}$ = NDI + CA
   (IF CA = Ø, CA = I AND NDI = NDI - 1)
6. ESD = ESD - CA
7. DETERMINE: ID = (WD - CA - PO)
8. DETERMINE: PD = (ESD - I)
9. DETERMINE: NPZI = $(\frac{120}{I})$
10. DETERMINE: NDP = (NDI - NPZI)

FIGURE 2.3

If the computer detects an error, the information must be corrected and re-entered. When all aspects of the problem are correct, the computer signals acceptance to the operator.

Since tank farm operating conditions sometimes make individual LOWs locally inaccessible, an offset mode of operating the van is provided. This mode is also used to gain additional operating stability and precision where needed. In offset mode, the drywell van is positioned some distance from the LOW. A fixture is used on top of the LOW to redirect the cable into the well. The computer system can accommodate either normally accessed or offset LOWs with equal ease.

The next operational step is to index the probe to the top of the LOW. Boom mounted controls outside the van are provided for operator convenience in positioning the probe and initiating or stopping the scan profile. Indexing of the probe to the LOW is accomplished by pressing the "start" control button once. Utilizing the cable slack detector switch as a sensor, the computer automatically positions the probe with respect to the top of the LOW, within 0.25 inch. A second "start" initiates the actual well scan.

The scan is fully automatic and is accomplished by rapidly inserting the probe into the drywell to the computed depth and accumulating data for each interval on retrieval. The retrieval speed is calculated and corrected every 0.05 feet (0.6 inch). For standard drywell vans, data counts and interval time (to 0.01 second) are accrued for each data interval and mathematically divided to normalize the data to counts per second (cps) per interval. For the dedicated acoustic van, data is obtained for each data point by the Krautkramer-Branson Model KB6000 (KB6000) Acoustic Inspection Unit and passed to the van computer as percent reflection amplitude.

Only data resulting from successfully completed well scans is stored in the computer memory for subsequent transmission via the Computer Automated Surveillance System (CASS) field microcomputers to the Central Surveillance Computer, where it is processed. As a portion of the data transmittal, the van computer provides the Central Surveillance Computer with the exact depth at which to plot the first data point. This depth is calculated as a part of the scan control problem. Since the reference was accurately established for the scan, the resulting plotted scan profile is precisely the profile "seen" by the detector's center of activity, regardless of the type of probe used.

Data transmission is accomplished by driving the drywell van to one of the CASS data entry points and connecting the data cable. Transfer is then initiated by pressing the "Message Transfer" button. The transfer is automatic and completely self-checking. The normal data entry points are located at A-Farm, BY-Farm, SX-Farm, and TX-Farm. Alternate data entry points are located at 2750-E Building and at 271-T Building.

3.0 DRYWELL VAN LOW PROBE FUNCTIONAL CHARACTERISTICS

3.1 GENERAL

In order to enhance the understanding of the LOW scan profiles, it is helpful to be familiar with the operating principals of each of the drywell van probes. Each probe provides supportive information which, when taken together, provides an assessment of the monitored tank's contents, including the ILL. How each probe contributes is, therefore, essential to the full understanding.

Standard drywell vans are configured in operation by the interchangeable probes and their associated computer codes. The same is true for the acoustic probe except that it is used only by Van Number 6, which has installed the extra required equipment, including the KB6000. All vans operate in the manner described in Section 2.0. The resulting data is characteristic and very repeatable.

3.2 NEUTRON PROBE

3.2.1 Physical Description

The neutron probe is contained in a stainless steel housing that is 22.4 inches long, including the removable neutron source. The weight of the probe is approximately 16 pounds with the source and internal lead gamma shield. The maximum outside diameter is 2.8 inches at the screw closure ring which allows over 0.2 inch of clearance in an LOW.

The key components of the probe are the detector, the preamplifier, the high voltage power supply, and the neutron source.

The detector is a Boron-Trifluoride (BF-3) type tube with an active length of 8.1 inches (11.6 inches overall) and a diameter of 1.5 inches. The gas is enriched to 96 percent (%) in ^{10}B and the fill pressure is 25 cm-Hg. The tube contains carbon to reduce gamma-induced neutron pulse degradation. The specific neutron sensitivity is approximately 6 cps in a uniform neutron flux of one neutron/cm^2/second. The detector is specified with a fixed counting efficiency.

The preamplifier module consists of a P-channel, insulated gate field effect input transistor with additional shaping and driving components. Transient clipping circuitry is provided for protection. The output is a 0.5 volt tail-pulse, capable of driving 1,000 feet of standard drywell van steel jacketed logging cable, 0.125 inch in diameter.

The high voltage module provides regulated + 1,350 volts D.C. to the detector.

The neutron source is 1.5 Ci 241Am/Be contained in a 2.0 inch x 0.75 inch doubly-encapsuled, Department of Transportation (DOT) approved pellet. This, in turn, is placed in a stainless steel holder 3.3 inches long by 1 inch in diameter. It is retained by a 0.5 inch thick lead screw, used to also shield the detector from the source gamma emissions. The source holder is attached to the probe by threading it onto the end, axially, using a special extension tool to reduce personnel exposure.

3.2.2 Operating Characteristics

The detector and preamplifier are designed to provide a very good pulse height resolution in order to operate in the high gamma flux encountered within the waste tank contents. As a result of this and a minimal lead gamma shield, the probe operates with zero gamma interference counts at a discriminator setting of 3.0 volts. The amplifier is adjusted to provide a maximum pulse amplitude of 8.0 volts. Under these conditions, the integrated count output is greater than 85% of all detected neutrons.

Probe count rate is somewhat effected by the amplifier gain setting. Therefore, the neutron probe is standardized in a moderating fixture, designed to produce a constant geometry for adjustment purposes. In the past, the allowable variation calculates to $\pm$7%. This has proven to be too great and should be reduced to an estimated $\pm$2 to $\pm$3%. This would result in a variance of only $\pm$50 to 75 counts at the 2,500 cps average count rate value, rather than $\pm$150 to 200, currently encountered.

A BF-3 detector is sensitive only to fully moderated (thermal energy equivalent) neutrons and is insensitive to fast or epithermal neutrons. Water contains hydrogen atoms which are efficient in moderating the fast neutrons emitted by the Alpha-N reactions of the neutron source material. Therefore, in the absence of other moderators, the observed count rate from this probe is a direct function of the moisture present in the surrounding media.

Within the in-tank environment of the LOW, the moisture or water content of the dry saltcake, the wet saltcake, and the liquid phase are each just sufficiently different to provide characteristic neutron probe count rate variations. It is these differences that trace the moisture profile of the neutron scan. The concentric field of view around the LOW is up to 36 inches in diameter and is centered vertically at the source position at the end of the probe.

3.3 GAMMA PROBE

3.3.1 Physical Description

The gamma probe is contained in a stainless steel housing identical, except in length and source attachment, to the neutron probe. The gamma probe is 13.25 inches overall in length and weighs ten pounds.

The gamma probe's key components are the detector and collimator shield, the preamplifier, and the high voltage power supply.

The detector is a small Geiger-Muller (GM) tube with an active length of 0.25 inch (2.0 inches overall) and a diameter of 0.29 inch. The fill gas is neon and it is halogen quenched. The sensitivity of the tube is specified with a fixed counting efficiency.

The detector collimator is a lead assembly, offering as much shielding as space permitted. Centered on the detector's active area is a radial window, machined into the lead with a width of 0.1 inch. This window provides a field of view of about one inch at a distance from the probe's center line of 6 inches. Sufficient material is retained in the window to exclude most low energy and secondary gammas and x-rays. The detector tube response is compensated with an aluminum and Lucite lining.

The preamplifier module consists of a pulse transistor amplifier of quite standard design. The unit is protected from transients. The output is a tail pulse of 0.5 volt constant amplitude. This preamplifier will also drive 1,000 feet of drywell van steel jacketed logging cable, .125 inch in diameter.

The high voltage module provides regulated + 900 volts D.C. to the detector.

3.3.2 Operating Characteristics

In the course of the LOW development activities, it was empirically determined that the principal gamma emissions originate in the liquid phase. The saltcake alone, in the few instances available for testing, exhibited little gamma content. This has since been shown to be accurate.

Gamma scans reflect the gamma activity viewed by the detector through the collimator window. The field of view around the LOW is approximately one foot in diameter in liquid and up to two feet in diameter in relatively dry saltcake. Vertically, the field of view is a little more than one inch at a 12 inch diameter source density.

The GM detectors have a uniform pulse amplitude, independent of incident gamma energy. They are therefore not sensitive to nominal variations in amplifier gain setting or discriminator level. Thus, the gamma probe's operational check is accomplished in a source cask, without accompanying need for adjustment. The maximum and minimum variations allowed in the check accommodate the procured detector variations and counting statistics. Unfortunately, the count rate in the cask is too low to reflect the tank environment. The best indication of a failing detector will be repeating scans of low amplitude.

3.4 ACOUSTIC PROBE

3.4.1 Physical Description

The acoustic probe is a stainless cylindrical housing, approximately 2 feet in length. The diameter is nominally 2.8 inches. The transducer is located 2.5 inches from the bottom of the housing. A flexible gasket surrounds the transducer and seals to the LOW inner wall. This forms a sliding chamber that, in operation, is filled with an acoustical or sound coupling medium.

Opposite the transducer, are two retractable rollers. These rollers are motor extended during a scan to press the acoustic gasket to the LOW inner wall. Simultaneously, the motor operates a valve which allows couplant to flow into the acoustic chamber, coupling the transducer to the LOW.

About halfway up the probe are four extended spring-loaded rollers. These are the point at which the probe pivots when the lower rollers extend.

At the top is a cap which when removed, provides access to a plastic bottle that is filled with the acoustic coupling fluid. The drywell van cable receptacle is mounted to the top of the cap.

The acoustic probe has no electronic modules except for a decoupling circuit arrangement. The drywell van cable for the acoustic van is a coaxial cable especially fabricated for this application. The attachment connector is also specific for this installation.

3.4.2 Operating Characteristics

Considerable information can be extracted from an interface between two materials using sound wave (acoustic) propagation and detection. This is true especially when the acoustic velocity (c) and density (ρ) of one of the materials are known. If a single acoustic pulse is propagated through a material of which the product of (ρ) and c (the characteristic impedance) is known, and the reflected pulse amplitude from the interface between this material and the unknown material is measured, the characteristic impedance of the unknown material and thus, its properties can be determined. The amplitude of the interface reflected wave will be directly proportional to the difference in characteristic impedance of the materials forming the interface. If there is little or no impedance difference, there is almost no reflected wave, and conversely, if there is a large difference, a large reflection amplitude will occur. These values can be readily quantified by the proper equipment.

In LOW monitoring, the acoustic pulse is initiated and the reflected pulse is measured by the KB6000 Acoustic Inspection Unit. The acoustic (electronic) pulse is sent to the transducer in the probe by the KB6000 where it is converted to a sound pulse. The pulse is coupled by the liquid coupling medium around the transducer into the LOW inner wall. The LOW is the material of known acoustic impedance. The interface between the outer LOW wall and the tank contents causes

the acoustic reflection that is detected by the transducer, and measured by the KB6000. It has been determined in the Instrument Development Laboratory and verified in LOW monitoring, that a fiberglass-liquid interface produces almost no reflected pulse amplitude, and that a fiberglass-air interface produces a maximum pulse reflection. Also, reflected pulse amplitudes from saturated salt is almost zero; from wet salt, somewhat higher; and, from dry salt, a large signal is obtained. Therefore, the conditions for monitoring an ILL in saltcake are established. The plot is expressed in terms of Percent Amplitude as a function of position. Below the ILL, the amplitude is 0 or near zero. Above the ILL, in dry saltcake or air, the amplitude is nearly 100%. The ILL transition is characteristically sharp due to the high resolution of the method.

The field of view into the tank is almost zero, since only the thinnest material in contact with the LOW causes the reflection. This may result in some possible limitations, should nonuniformity of an interface produce erratic results.

4.0 MEASUREMENT CHARACTERISTICS

4.1 GENERAL

4.1.1 Repeatability

All LOW data has been obtained at a probe speed of 0.1 foot/second, using a data interval of 0.1 foot. The plotted resolution, therefore, cannot exceed $\pm$0.1 foot, even if there were no additional errors. The drywell vans are programmed to provide speeds as low as 0.05 foot/second and intervals of 0.05 foot. This use would effectively improve the resolution, if the graphics processing capability were available.

In order to reduce repeatability errors, the drywell van computer software is being modified. This modification will require some time to be fully implemented and may result in some minor data shifting when it is. It is believed that most standard drywell vans now have the new software; but the acoustic van, Number 6, does not. Most plots used in this document preceded this modification. The following is a summary of the major revisions:

- Depth Calibration - Each drywell van's depth measuring system must be calibrated daily, prior to use, against a standard drywell approximately 100 feet deep. This calibration is automatic and is used to correct all scans positionally to the nearest 0.05 foot.
- Operator/system interactive errors automatically will now cause a rescan in most instances. Any operator option has been eliminated.
- Deformed LOWs that cause the acoustic probe to hang, producing data shifted scans, will now error, requiring another try.

- o All probe offset and detector offset distances are now measured in twentieths of a foot rather than tenths. This reduces rounding errors since the data is used in well logging calculations (see Figure 2.3).

- o The location of the plot points for standard count integrating drywell vans was repositioned to the center of the accumulated data interval. The acoustic van is not an integrating system and the data will remain presented as it is taken. This change removes a 0.05 foot possible presentation shift of the data between the two types of vans.

As a result of the improvements, data positional accuracy and repeatability can achieve a working capability of ±0.1 foot, providing the necessary system support is provided. The maximum systematic errors are:

Indexing	=	±0.3 inch
Depth Calibration	=	±0.6 inch
Data Rounding (CASS)	=	±0.6 inch
TOTAL ERROR	=	±1.5 inches (±.125 foot)

As noted, most random error possibilities have been eliminated. Any that occur should now be obvious and would necessitate rerun. There is one major exception to point out. The LOW scans, using the standard drywell vans with the gamma and neutron probes, are not stabilized. That is, the offset fixture that can be used to provide increased accuracy is not used because it requires additional time. This may or may not be a significant penalty but could show up as a random error. If either the drywell van's resting position or the cable boom are moved any, after LOW indexing has been completed, an error that will proportionally shift the scan profile will result.

This discussion has centered on the field equipment. The perceptual accuracy achieved by the data plots also has limitations. However, this review is supportive of a ±0.1 foot repeatability contention.

4.1.2 Measurement Methodology

Neutron and gamma scan data is obtained from LOWs using three each gamma and neutron probes (one of each in East Area and West Area, plus one spare) with any of five different drywell vans. Therefore, for scan data to be repeatable, all five systems must operate uniformly with the same precision. This, when followed through properly, results in true plot positional accuracy, assuming that the detector offset (the distance from the bottom of the probe to the detector's center of activity) is properly managed. Since acoustic LOW data is obtained with the same methods, all LOW data plots should be coincident. As mentioned earlier, random errors can occur, but coincident data presentation is still a functional necessity.

The philosophy of a swimming pool ILL beneath saltcake seems to have been anticipated. The acoustic probe could scan such a pool and provide a very simple plot presentation. The ILL then could be measured accurately with minimal expertise.

Although in some cases, these simplified expectations are achieved, there are many more cases where the foregoing is not true. Thus, it is necessary to achieve a detailed understanding of the total presentation of the LOW system before a method is established to measure change and react to it. This is precisely why data from all three types of probes is sometimes needed to determine if change has occurred which signifies leakage or intrusion, or if some internal saltcake mechanism is causing only an apparent change. Some of these saltcake conditions mask suitable acoustic ILL determinations.

It should not require a major effort to periodically integrate the three data plots for each of the 58 LOWs. By this means, a tank ILL is assigned that represents the best presentation to perhaps a complex situation. For example, assume we are dealing with a non-jetpumped tank that has a very wet floating, but solid, crust. The gamma probe can generally define either that the crust is still draining or that the ILL is formed underneath. The neutron probe can provide the surface of the crust and the ILL below the crust. The acoustic probe may indicate an ILL underneath the crust, in the crust, or the top of the crust. If it is either the ILL in the crust or the top of the crust, such an ILL will change and probably will be erratic. It is measuring only the amount of free liquid present - not what is happening to the ILL. The acoustic presentation also might well indicate the bottom of the crust, some level in the crust, and the top; all on the same scan. It is therefore necessary to arrive at a single parameter for which action criteria can be assigned. This can be done if some basic tank groupings are made and the ILL values within the group normalized.

The principal groupings used by this document are only three: non-jetpumped, partially jetpumped, and jetpumped. This grouping seems to provide a common basis for the data.

The term ILL must take on a broader meaning than just interstitial liquid level. In the case of liquid and solids coincident to the surface, ILL must mean the surface/air interface. If there is a crust (floating solidified saltcake), the ILL is taken as the bottom or the saltcake/liquid interface. In the case of a liquid gradient in saltcake that progressively contains more free liquid, the ILL is that depth indicated as the drainage point, since anything above that is unstable.

5.0 DATA ANALYSIS

5.1 GENERAL

An understanding of the characteristics of the various probe profiles of each tank is best acquired if the scans are related to the tank's history. Since this study is severely time limited, the tanks have been grouped in the same manner as Reference 3. Thus, category Type I is the non-jetpumped tank; Type II is the partially jetpumped tank; and Type III is the jetpumped tank. Although this arrangement provides an initial starting point, variants will occur as a result of different tank contents (saltcake, sludge, or saltcake/sludge), different processing of the saltcake, aging, temperature, etc. However, the three major groups do result in quite useful arrangements for the purpose of understanding what each of the drywell van probes is displaying. More subtle events require greater comprehension than this document may be able to provide except by a few unique examples. A number of these are presented in Appendix A. For use as a ready reference, the Summary page of Reference 4 for each tank with an LOW is included as Appendix B.

For the full appreciation of the capabilities of the LOW monitoring system, it is essential to complete and understand Section 5.0, "Data Analysis," and then to study each of the eight examples of Appendix A.

5.2 PROFILE TYPE I: NON-JETPUMPED TANKS

5.2.1 General

This tank category is comprised of those tanks containing non-jetpumped saltcake, sludge, or mixtures thereof that can be generically classed as a slurry and that are characterized by LOW scans indicating that the liquid level and the saltcake/sludge level are the same or are almost nondistinguishable separately. Variants to this category would include non-jetpumped tanks with surface crusting and tanks whose ILL is somewhat lower due to aging, evaporation, or leakage.

This category represents a significant number of tanks containing LOWs. There are presently 31 tanks that fit this category. Of additional importance is the fact that these tanks have contents that have been measured by other means (although less accurately) than by LOW scans. A preliminary effort has been made to correlate the data in Appendix B to LOW data. Table 5-1 provides a listing of this data by tank. In general, the agreement is quite good and supports the historical record compilation. Additional work should address saltcake aging with respect to ILL lowering and possible saltcake structure development (Ostwald Ripening). Core sample data can possibly be used for calibration to directly measure porosity.

UNPUMPED TANKS (TYPE I)

TANK	RHO-CD-213 MATERIAL LEVEL	ILL DATA			NEUTRON PROBE END FACTOR	SURFACE DESCRIPTION/CONTENTS/COMMENTS (FROM SCANS AND RHO-CD-213)
		GAMMA	NEUTRON	ACOUSTIC		
101A	28.8	30.9 (C)	29.3	30.9/29.3	0	Top of crust at 30.9 feet/Gamma probe swamped except for crust
103A	15.8	15.0	14.9	15.8 (C)	0	Top of wet crust at 15.8 feet
101AX	23.0	23.9 (C)	22.8	23.8/22.8	0	Top of crust at 23.8 feet/Saltcake with visible puddle
104B	11.0	11.7	11.8	11.8	.8	Saltcake and sludge (very thin, wet crust - indicated only by gamma probe)
105B	3.4	3.8	3.8	3.8	0	Saltcake and sludge
111BX	6.8	7.5	7.5	---	.8	Liquid with floating scum and solids/Saltcake and sludge/Assumed leaker
102BY	13.8	15.0	15.1	---	.8	Large pool in center of tank
103BY	15.0	15.1	15.1	15.1	.8	Liquid, intrusions, confirmed leaker
105BY	15.7	-----	13.5	13.6	.8	Pools/Assumed leaker (gamma indicates saltcake at approximately 14 feet - indicates change)
106BY	20.0	20.3	20.3	20.3	.8	Pools/Assumed leaker
109BY	15.1	14.7	14.7	14.8	.8	Liquid with floating scum or saltcake (acoustic data may vary to 15.5 feet)
101S	13.4	13.5	13.6	13.6	.8	Liquid with floating saltcake
102S	16.9	16.7	16.8	16.7	.8	Liquid with floating solids
103S	8.6	8.6	8.6	8.6	.8	Liquid
101SX	14.1	13.9	14.0	14.0	.8	Liquid center, perimeter has sludge crust
102SX	16.9	16.9	17.0	16.9	.8	Saltcake and sludge/Liquid pools
103SX	20.5	20.7	20.6	20.5	.8	Liquid with floating solids/Saltcake and sludge
104SX	23.2	22.0	22.0	23.4 W/S	0	Top of wet saltcake at 23.4/Saltcake and sludge/Small pools visible
105SX	21.2	21.3	21.2	21.2	.8	Saltcake and sludge/crust-like
106SX	15.8	15.5	15.6	15.5	.8	Saltcake with liquid visible
104T	13.0	13.0	13.1	13.8 (C)	0	Top of wet crust at 13.8 feet/Damp sludge with liquid visible
110T	12.2	-----	12.8	13.3 (C)	0	No gamma measurable/Wet crust/Sludge tank, liquid around saltcake
111T	13.5	14.3	14.3	14.3	.8	Flat surface sludge/Assumed leaker
102U	10.9	11.9	11.8	11.7	.8	Liquid surface
103U	13.8	15.1	15.0	14.9	.8	Liquid surface with floating saltcake
105U	12.3	13.6	13.6	13.4	.8	Saltcake and sludge with liquid surface
106U	6.5	7.6	7.6	7.6	.8	Saltcake and sludge with liquid surface
107U	11.9	11.7	11.8	11.6	.8	Saltcake and sludge with liquid surface and floating scum
108U	13.8	15.1	15.1	15.0	.8	Saltcake and sludge, floating saltcake
109U	13.7	15.0	15.0	14.9	.8	Saltcake and sludge, large areas of clear liquid
111U	9.5	10.8	10.9	11.0	.8	Saltcake and sludge, damp crust

(C) = Crust

W/S = Wet Saltcake

TABLE 5-1

UNPUMPED TANKS (TYPE I)

TABLE 5-1

SUPPORTING DOCUMENT SD-WM-TI-237 Rev. 0 17

5.2.2 Neutron Probe Data Assessment

Figure 5.1 is a simplified sketch of a typical neutron probe scan of a Type I tank.

Since the neutron probe count rate is a measure of the moisture content of the surrounding medium, and since the contents of this type of tank appear to be a somewhat uniform slurry, the typical moisture variation with depth is minimal. The count rate value averages around 2,500 cps. This average value will be approximately maintained during a scan until the neutron probe approaches the surface/air interface. At about 0.8 feet below the surface, fast neutrons begin to escape the counting system, causing the count rate to begin a rapid decline. This is noted in Figure 5.1 as point "B." As the probe continues to rise, the count rate drops dramatically to near zero (about 50 cps) at the surface. This is designated in Figure 5.1 as point "A." As the probe rises above the surface, the count rate continues to fall to about 10 to 20 cps where it stays while in the air space above the tank contents. As the probe enters the riser exiting the tank dome, the count rate increases again proportionally to the moisture in the surrounding medium. At 6 feet from the top, data logging is terminated. Note that the LOW is essentially transparent.

The surface or (perhaps in a misuse of the term in this case) the ILL, is identified as point "A." Note that it is also identified as point "B" + 0.8 feet. These relationships will be of importance and so will tools to measure each accurately.

As an example of an actual scan, refer to Figure 5.2 of Tank 102-U.

Point "A" = 11.8 Feet
Point "B" = 11.0 Feet
A = B + 0.8 = 11.0 + 0.8 = 11.8 Feet

A triangle was used for these determinations, but graphics and a horizontal cursor indicating depth would increase the accuracy and facilitate the measurement. Note that at point "B" the actual scan depresses somewhat. For measurement, use the slope line as shown.

5.2.3 Gamma Probe Data Assessment

Figure 5.3 is a simplified sketch of a typical gamma probe scan of a Type I tank.

The gamma intensity of a dilute slurry tends to be rather high because the major gamma contribution is from the liquid phase. Since the Type I tank contents is rather uniform, little change is noted as the probe ascends toward the surface. More saltcake structural effects can be noted as opposed to sludge. As the probe passes through the surface, the count rate rapidly decreases. The surface or ILL is designated as the center of the most linear portion of the transition as is shown. Above the surface, the gamma intensity decreases as the square of the distance from the probe to the surface of the tank contents. As the probe enters the riser, the count rate decreases rapidly to essentially zero.

SIMPLIFIED NEUTRON PROBE SCAN TYPE I TANK

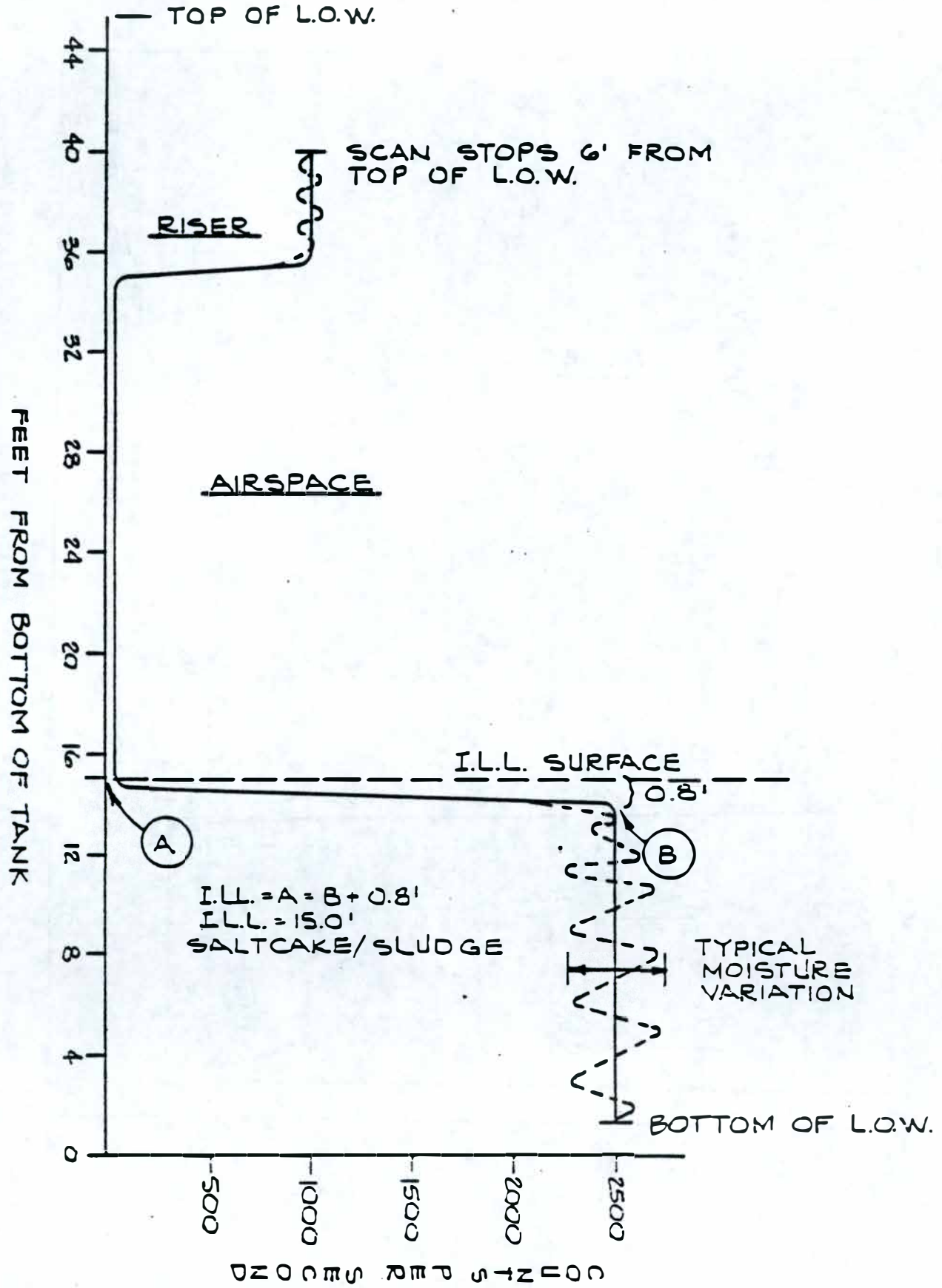


FIGURE 5.1

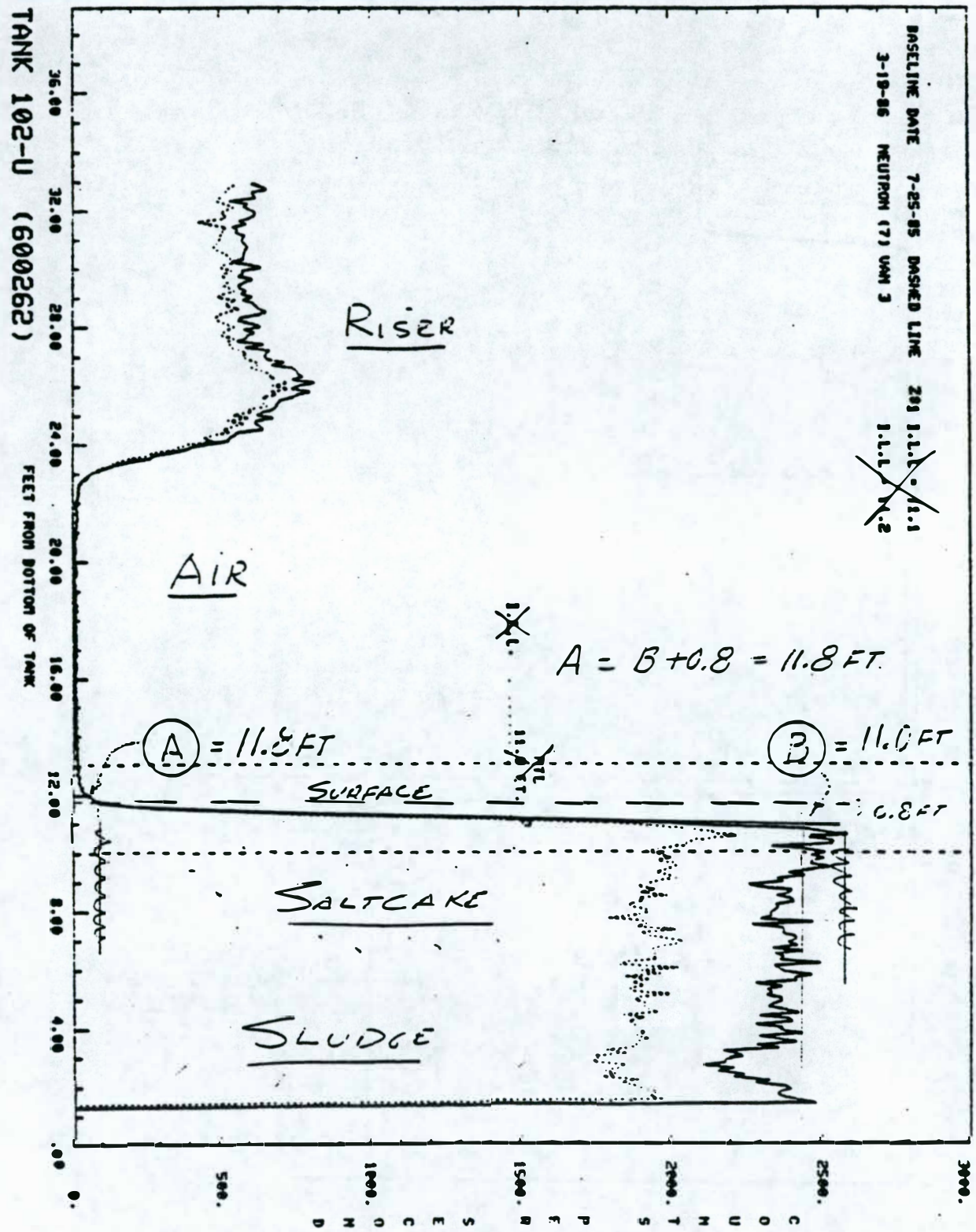

TANK 102-U (600262)
BASELINE DATE 7-25-85 DASHED LINE 291 1.1.1
3-19-86 NEUTRON (?) VAN 3
RISER
AIR
A = B + 0.8 = 11.8 FT.
A = 11.8 FT
B = 11.0 FT
SURFACE
0.8 FT
SALTCAKE
SLUDGE
FEET FROM BOTTOM OF TANK
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
0.
500.
1000.
1500.
2000.
2500.
3000.

FIGURE 5.2

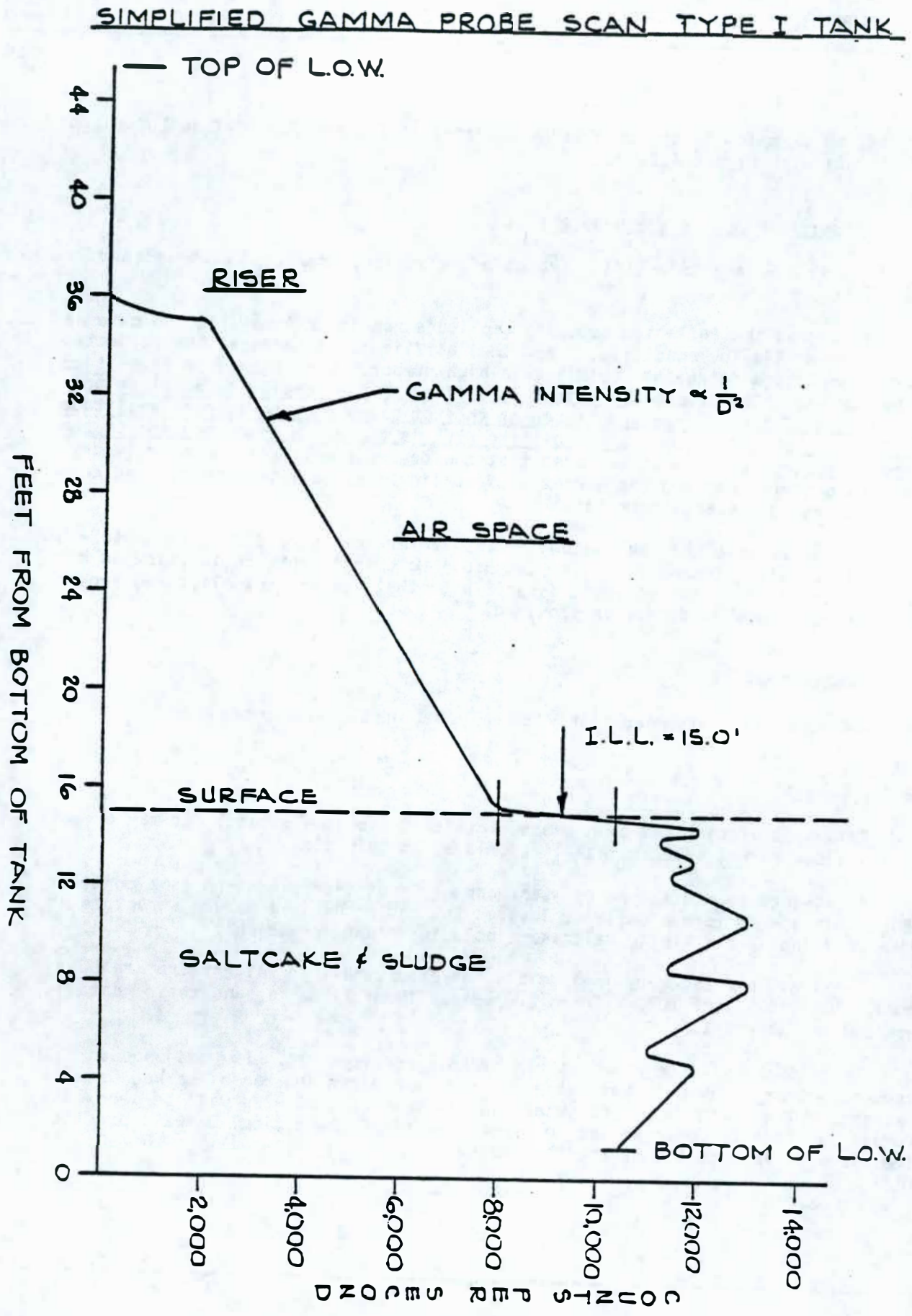

SIMPLIFIED GAMMA PROBE SCAN TYPE I TANK
TOP OF L.O.W.
RISER
GAMMA INTENSITY ∝ 1/D²
AIR SPACE
I.L.L. = 15.0'
SURFACE
SALTCAKE & SLUDGE
BOTTOM OF L.O.W.
FEET FROM BOTTOM OF TANK
0
4
8
12
16
20
24
28
32
36
40
44
2,000
4,000
6,000
8,000
10,000
12,000
14,000

FIGURE 5.3

As an example of an actual scan, refer to Figure 5.4 of Tank 102-U and compare this with Figure 5.2.

5.2.4 Acoustic Probe Data Assessment

Figure 5.5 is a simplified sketch of a typical acoustic probe scan of a Type I Tank.

So long as the reflected acoustic amplitude remains minimal, it indicates a wet or free liquid condition. At the air/liquid interface, the reflected acoustic amplitude increases rapidly to a high number. This change or transition is the surface. The precise location is defined as that amplitude equal to one-half the sum of the average amplitude of the wet phase and the average amplitude of the dry phase. The value of the ILL is the depth corresponding to the averaged amplitude. It must be noted that the dry phase is not necessarily dry. Free liquid is the key and the amount of free liquid at an interface can and does vary, distorting the scan somewhat.

As an example of an actual scan, refer to Figure 5.6 of Tank 102-U. Compare in detail, Figures 5.2, 5.4, and 5.6. Note that depth calibration is not yet operational for the acoustic data. With that exception, all three probes agree and considerable detail is provided.

5.3 PROFILE TYPE II

The partially jetpumped tank with a Type I or III scan profile.

5.3.1 General

This type of tank has been pumped (at least to some extent) but may or may not exhibit a marked interstitial liquid level at this time.

A category for this type of tank appears justified since the tank contents will likely age to form a definite lowered ILL and probably a marked structure in tanks principally containing saltcake (including crust formation).

Tanks of this category include all "S" Farm tanks, in which there are LOWs, except 101, 102, and 103. There are seven Type II tanks and their data is provided in Table 5-2.

Tank 109-S will be used as an example of Type II. It was used as the intrusion test tank of Reference 3 and exhibited an area of marked Ostwald Ripening. The test was conducted in September 1981. As will be seen, the profile has totally changed and no longer exhibits the typical Ostwald profile. Otherwise, it is a stable tank with a marked ILL.

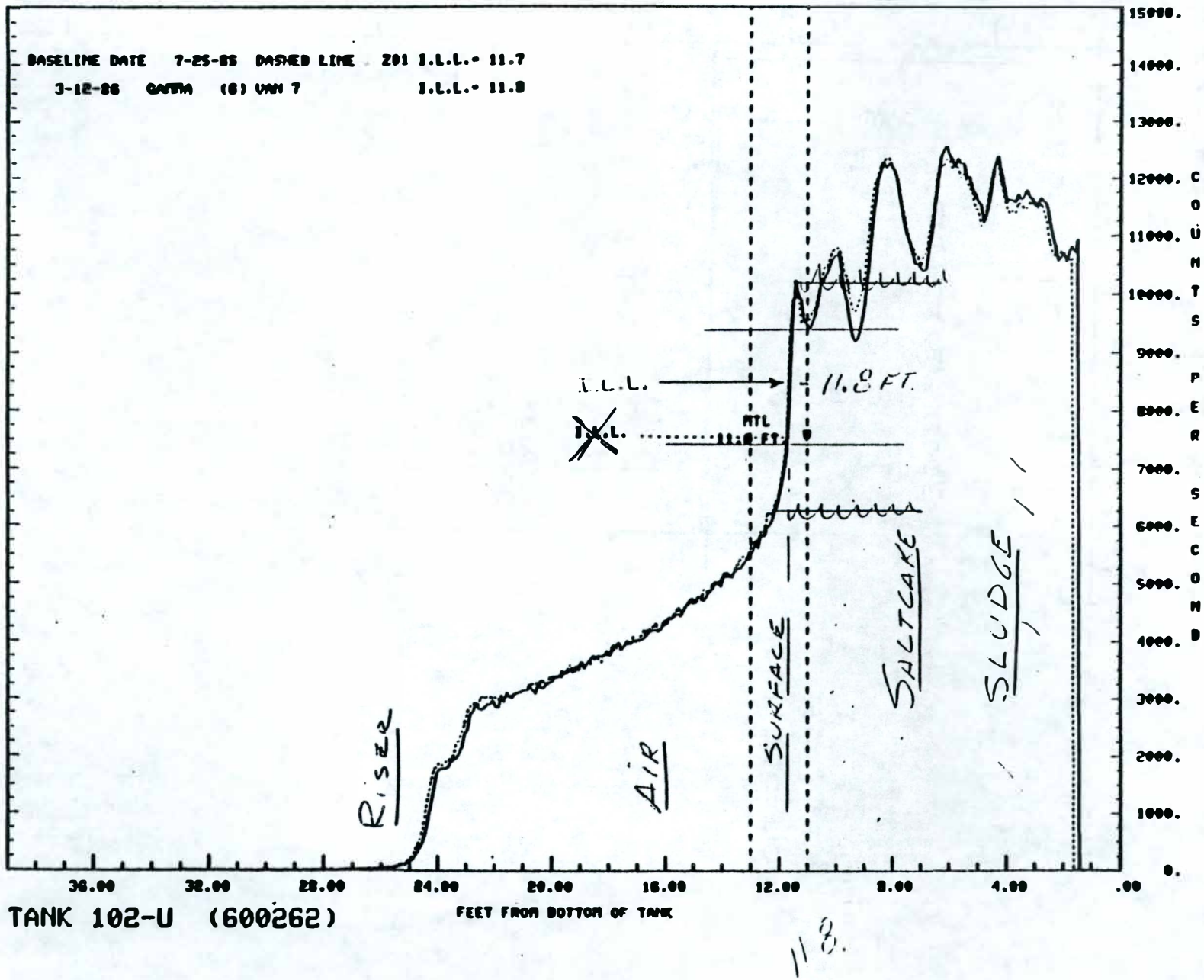

BASELINE DATE 7-25-86 DASHED LINE 201 I.L.L.= 11.7
3-12-86 GAMMA (G) VAN 7 I.L.L.= 11.8
I.L.L.
11.8 FT.
RTL
11.8 FT.
RISER
AIR
SURFACE
SALTCAKE
SLUDGE
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 102-U (600262)
FEET FROM BOTTOM OF TANK
11.8.

FIGURE 5.4

SIMPLIFIED ACOUSTIC PROBE SCAN TYPE I TANK

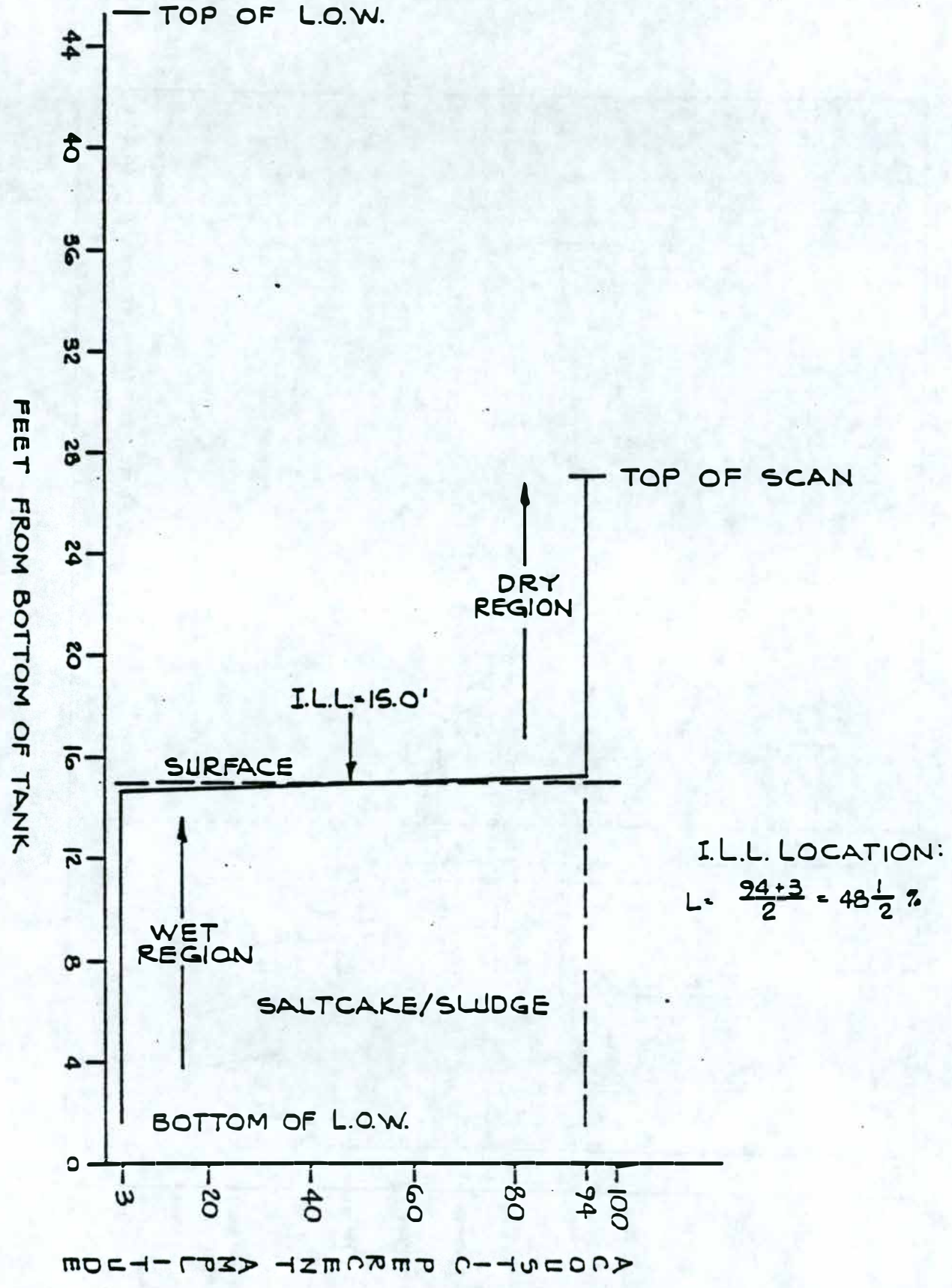


FIGURE 5.5

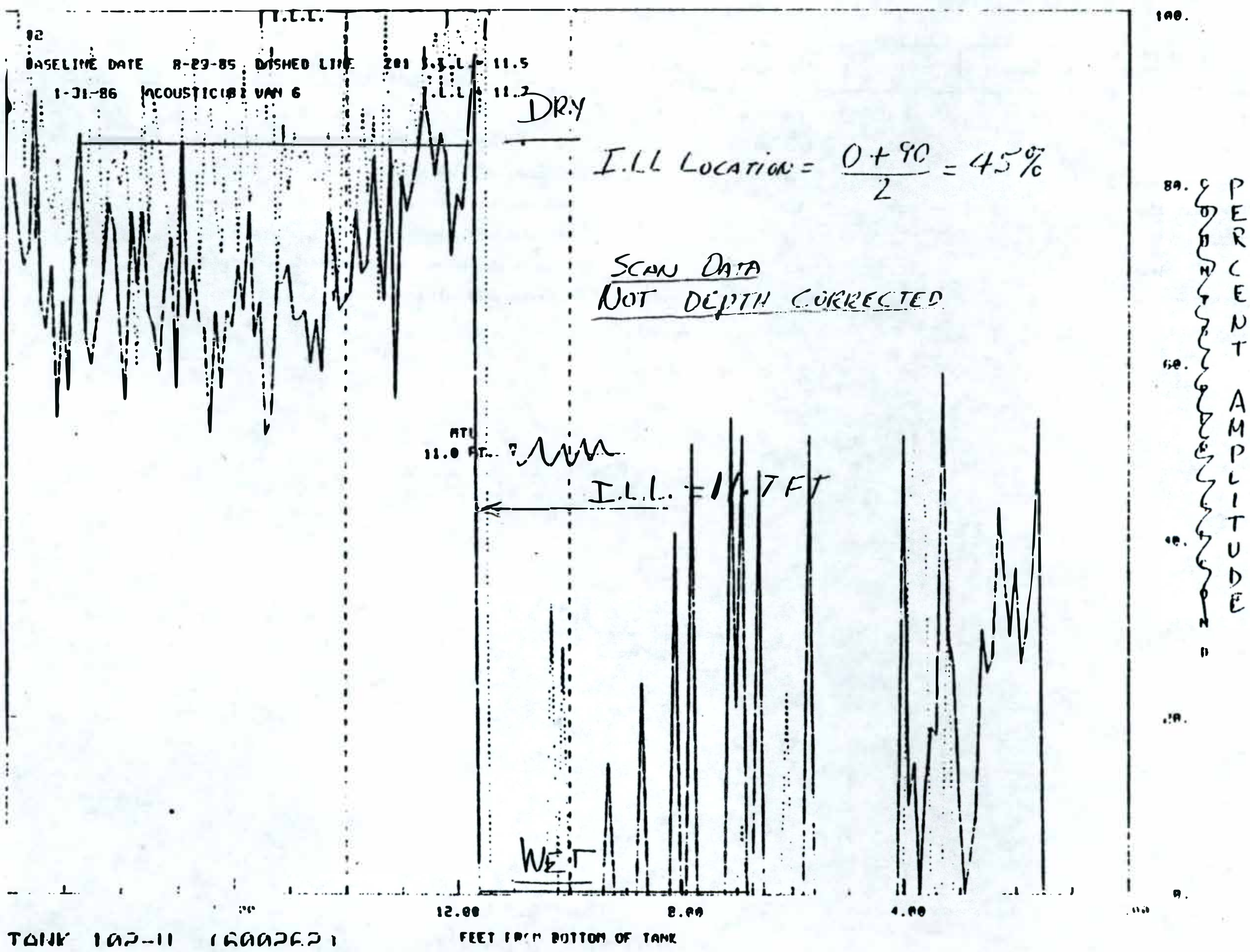

I.L.L.
BASELINE DATE 8-29-85 DASHED LINE
1-31-86 ACOUSTIC(B) VAN 6
DRY
I.L.L LOCATION = (0+90)/2 = 45%
SCAN DATA
NOT DEPTH CORRECTED
11.0 FT.
I.L.L. = 11.7 FT
WET
100.
80.
60.
40.
20.
0.
12.00
8.00
4.00
FEET FROM BOTTOM OF TANK
PERCENT AMPLITUDE

FIGURE 5.6

PARTIALLY PUMPED (TYPE II)

TANK	RHO-CD-213 MATERIAL LEVEL	ILL DATA			NEUTRON PROBE END FACTOR	SURFACE DESCRIPTION/CONTENTS/COMMENTS (FROM SCANS AND RHO-CD-213)
		GAMMA	NEUTRON	ACOUSTIC		
105S	11.5	4.0	4.0	4.0	.8	Saltcake with liquid visible
106S	14.2	14.0	14.0	14.3 (C)	0	Top of saltcake approximately 15.6, wet gradient to 14.0 feet/Saltcake with liquid visible
108S	15.2	9.1	9.0	9.1	0	Saltcake, no liquid visible
109S	15.4	10.9	10.9	10.8	.8	Saltcake with liquid visible
110S	12.9	11.7	11.8	11.9	.8	No photos available
111S	16.9	17.0	17.2	17.1	.8	Saltcake and sludge, liquid surface in center of tank
112S	16.3	9.6	9.7	9.7	.8	Saltcake, deep hole around saltwell

(C) = Crust

TABLE 5-2
PARTIALLY PUMPED (TYPE II)

5.3.2 Neutron Probe Data Assessment

Figure 5.7 is a simplified sketch of a typical neutron probe scan of a Type II tank.

The neutron probe will often "see" various amounts of structure in the saltcake or sludge below the ILL. These variations can sometimes be traced with the tank documentation(4). As the surface of the ILL is approached during the scan, neutrons will escape the counting system if the adjacent medium is quite dry. Thus, a rapid decrease in count rate will occur as the probe passes point "B." Since this example represents a very dry transition, the end effects are significant and 0.8 foot must be added to "B" to determine the ILL. In the example, point "B" is at 10.0 feet. Thus, the ILL is at 10.0 + 0.8 = 10.8 feet.

As an example of an actual scan, refer to Figure 5.8 of Tank 109-S. The top of the saltcake is at about 15.5 feet and the ILL is at "B" + 0.8 foot = 10.8 feet. See Reference 3 for changes to this tank since 1981 intrusion tests. This provides some insight to changes that occur, but which can be effectively monitored.

5.3.3 Gamma Probe Data Assessment

Figure 5.9 is a simplified sketch of a typical gamma probe scan of a Type II Tank.

The gamma intensity below the ILL is quite high with characteristic saltcake structure. The ILL is a sharp transition and is located in the center of the most linear part thereof. Above the ILL, the gamma intensity decreases continuously to the top of the saltcake.

As an example of an actual scan, refer to Figure 5.10 of Tank 109-S.

5.3.4 Acoustic Probe Data Assessment

Figure 5.11 is a simplified sketch of a typical acoustic probe scan of a Type II tank.

There is no complexity in the simplified sketch. The fact remains that one-half the sum of the average wet region amplitude and the average dry region amplitude is the location at which the ILL is to be measured. Then, the measured value, as shown, is 10.8 feet. Nothing much above or below this line is of any consequence unless it can be correlated to the other probes. In this example, there is no correlation, except for the ILL.

As an example of an actual scan, refer to Figure 5.12 of Tank 109-S.

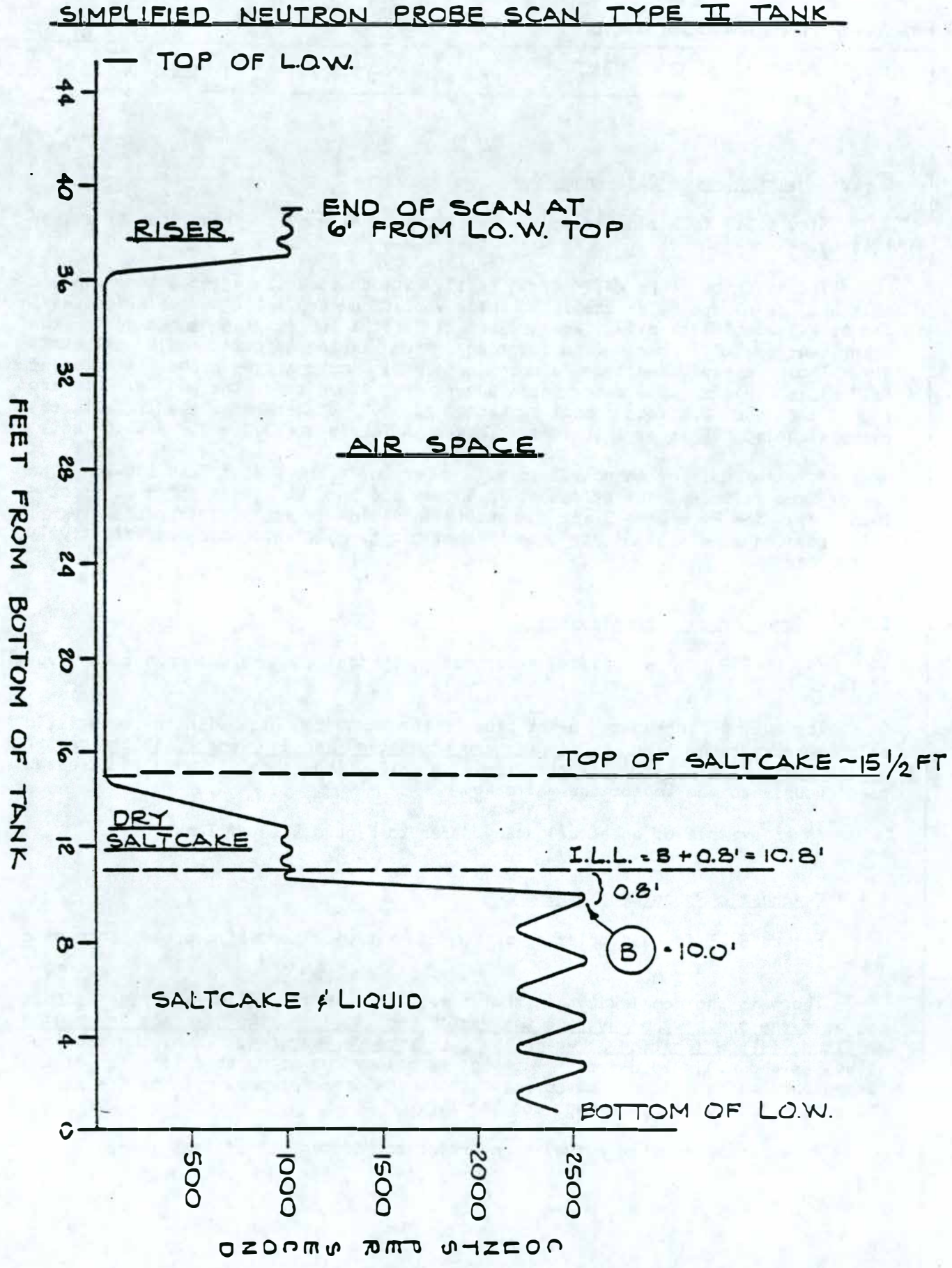

SIMPLIFIED NEUTRON PROBE SCAN TYPE II TANK
TOP OF L.A.W.
RISER
END OF SCAN AT 6' FROM L.A.W. TOP
AIR SPACE
TOP OF SALTCAKE ~15 1/2 FT
DRY SALTCAKE
I.L.L. = B + 0.8' = 10.8'
0.8'
B = 10.0'
SALTCAKE & LIQUID
BOTTOM OF L.A.W.
FEET FROM BOTTOM OF TANK
0
4
8
12
16
20
24
28
32
36
40
44
500
1000
1500
2000
2500

FIGURE 5.7

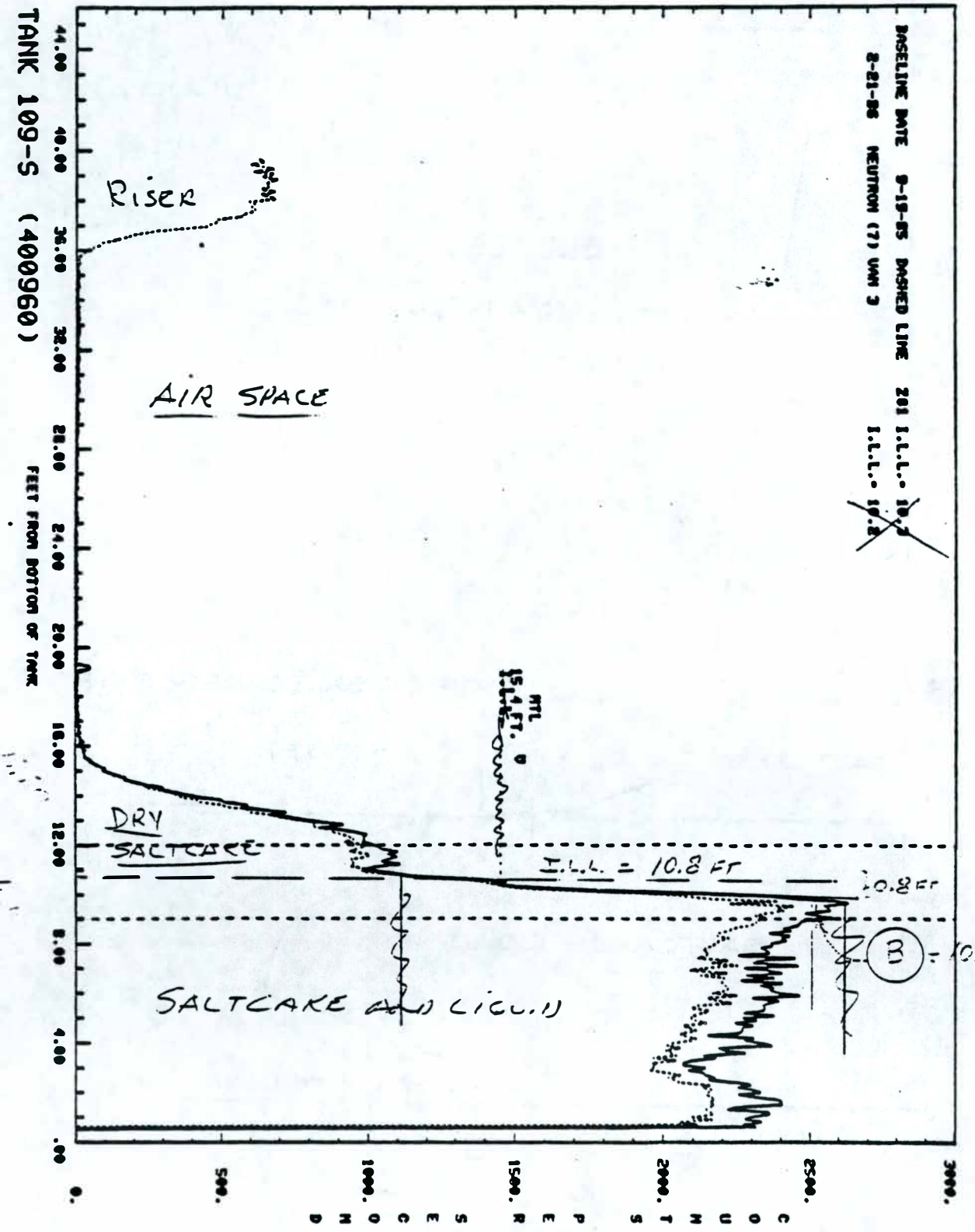

TANK 109-S (400960)
FEET FROM BOTTOM OF TANK
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
0.
500.
1000.
1500.
2000.
2500.
3000.
COMMON SPECTRUM
BASELINE DATE 9-19-85 DASHED LINE 201 I.L.L.= 10.8
8-21-86 NEUTRON (7) UNN 3
I.L.L.= 10.8
Riser
AIR SPACE
DRY SALTCAKE
SALTCAKE AND LIQUID
I.L.L. = 10.8 FT
10.8 FT
10.0 FT
(3)

FIGURE 5.8

SIMPLIFIED GAMMA PROBE SCAN TYPE II TANK

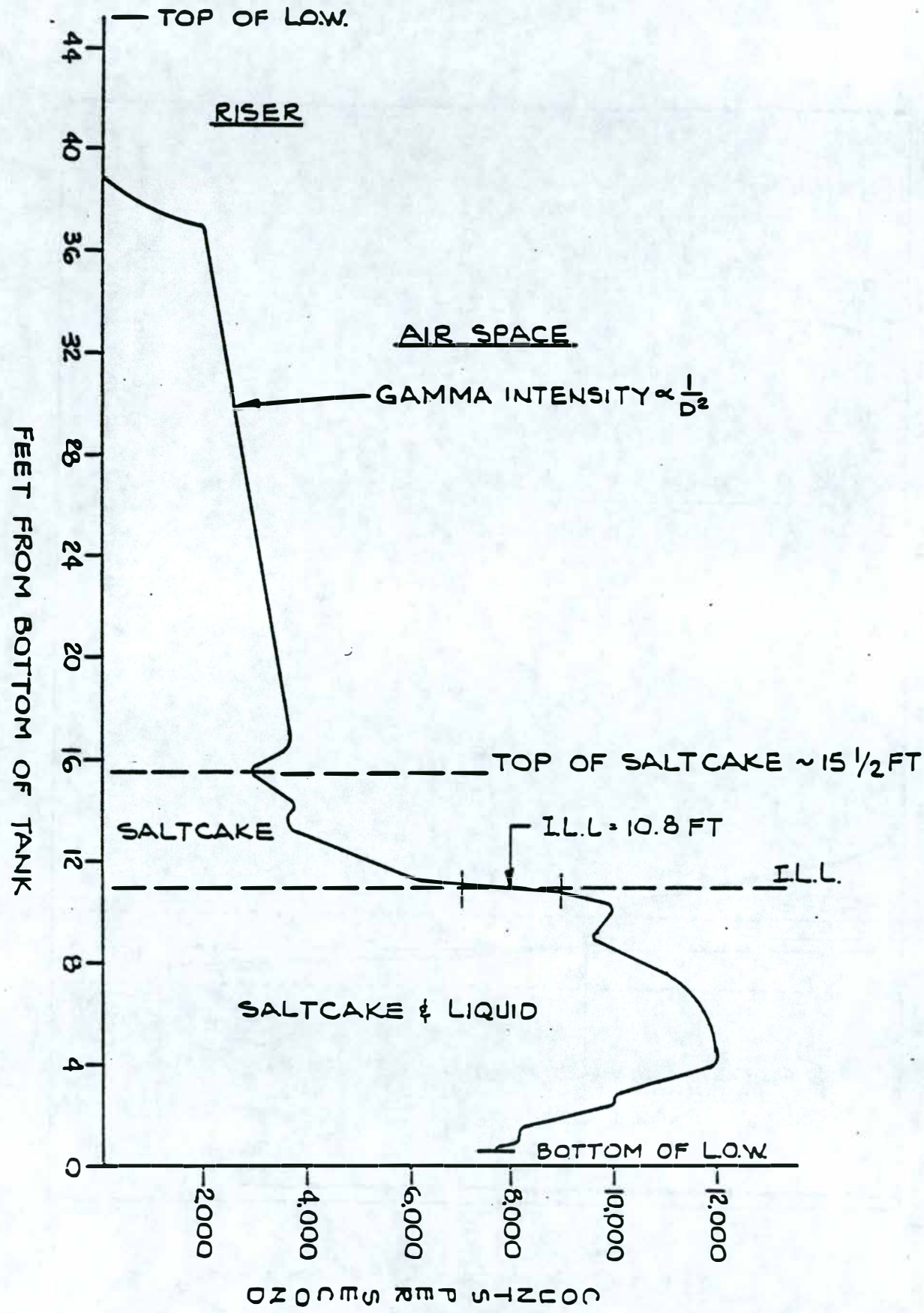


FIGURE 5.9

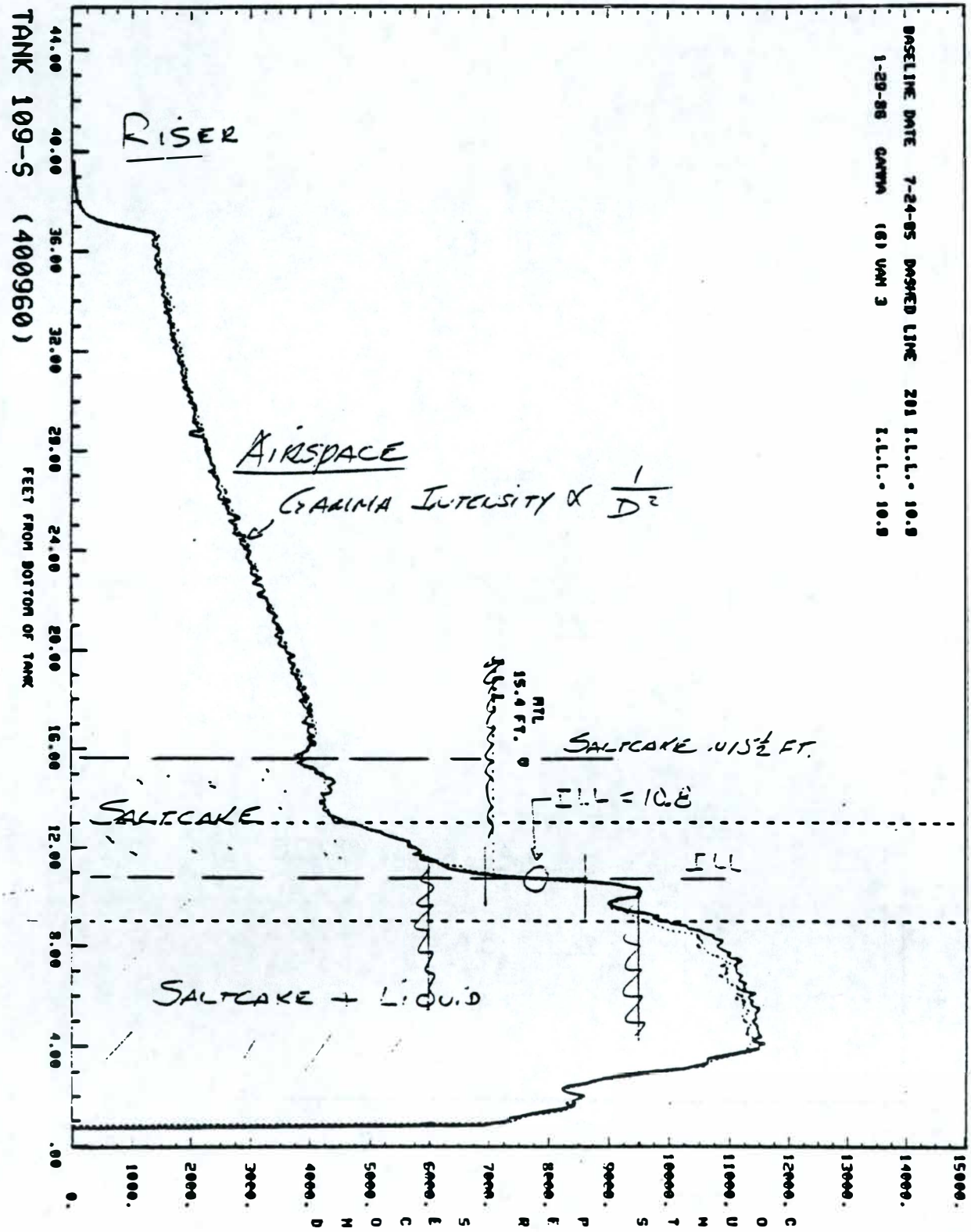

TANK 109-S (400960)
FEET FROM BOTTOM OF TANK
BASELINE DATE 7-24-95 DASHED LINE 201 I.L.L. 10.9
1-20-96 GAMMA 101 VAH 3 I.L.L. 10.9
RISER
AIRSPACE
GAMMA INTENSITY ∝ 1/D²
SALTCAKE .UI5½ FT.
SALTCAKE
I.L.L = 10.8
I.L.L
SALTCAKE + LIQUID
ATL 15.4 FT. 0

FIGURE 5.10

SIMULATED ACOUSTIC SCAN TYPE II TANK

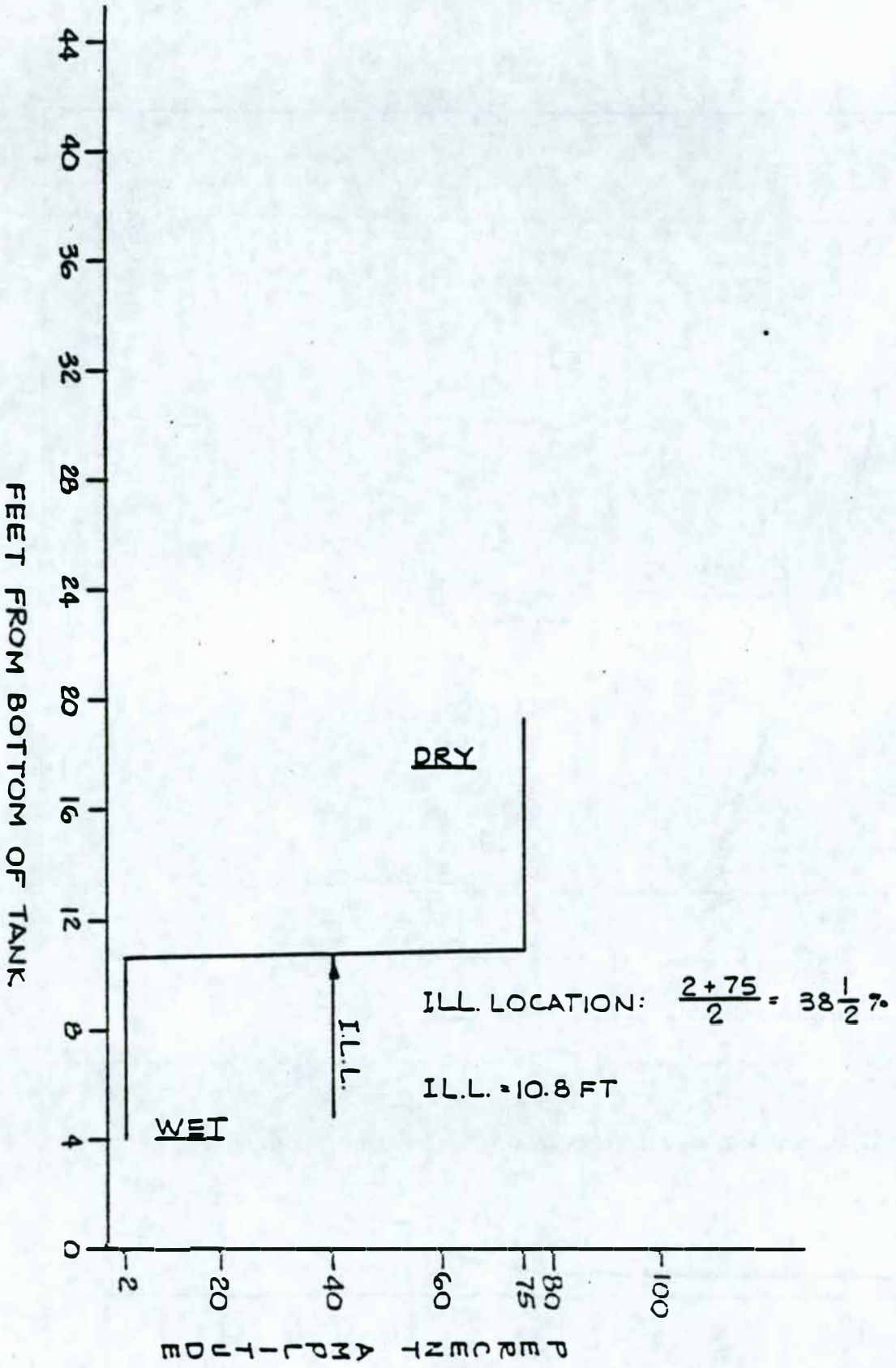


FIGURE 5.11

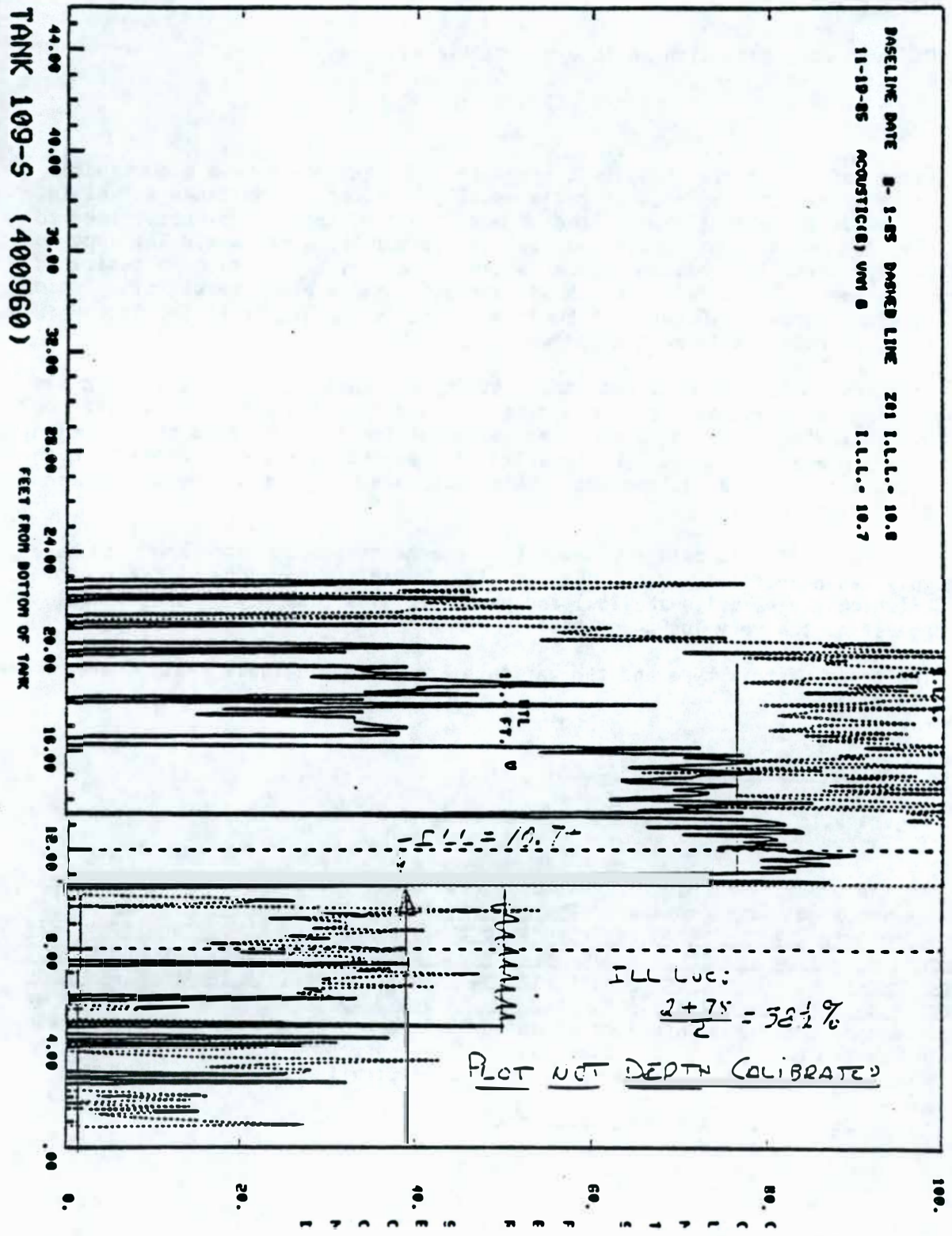

TANK 109-S (400960)
FEET FROM BOTTOM OF TANK
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
0.
20.
40.
60.
80.
100.
BASELINE DATE 8- 1-95 DASHED LINE 201 1.L.L.= 10.8
11-19-95 ACOUSTICS; VAM 8 1.L.L.= 10.7
1.L.L.= 10.7
ILL LOC:
2+7½ / 2 = 5 2½ %
PLOT NOT DEPTH CALIBRATED

FIGURE 5.12

5.4 PROFILE TYPE III

The jetpumped tank with an interstitial level.

5.4.1 General

Tanks of this group indicate a prominent ILL that may have a slow tendency to lower as a result of aging. There is usually considerable saltcake structure. In this regard, there is a common zone to many tanks of this group, about one to four feet in depth, just above the ILL or former ILL locations. The zone is typified by markedly reduced gamma activity and by a reduction in indicated moisture content. It is felt that these characteristics are a result of intense large crystal growth (Ostwald Ripening). Little drainable (free) liquid is expected to be retained in such a region.

The free liquid contained in jetpumped tanks can be estimated quite rapidly using gamma and neutron probe data. Some correction for porosity can be made by observing neutron probe end effects (neutrons lost to the counting system) and gamma intensity. The results of these calculations suggest a much higher drainable liquid volume than those published in status documents (see Appendix A, Example VI).

Some tanks of this category have been pumped quite some time ago and have thoroughly aged profiles. Many, but not all, exhibit a very dry saltcake above any ILL (which may be quite shallow) and gamma profiles that may be statistically poor because of the very low count rate.

The tanks of this type and the variants are listed in Table 5-3. There are twenty total.

5.4.2 Neutron Probe Data Assessment

Figure 5.13 is a simplified sketch of a typical neutron probe scan of a Type III Tank.

As the probe is withdrawn, the count rate usually averages around 2,500 cps until an interface is approached. The end effect of the underlying interface is proportional to the moisture ratio and to the sharpness of the transition. If the transition from the ILL is into a very wet saltcake gradient, no end effect can be discerned. On the other hand, if the transition is into an immediate zone of dryness, then the value illustrated in Figure 5.13 should be used. Thus, as the probe approaches the interface at point "B," some neutrons become lost to the counting system and the count rate rapidly decreases. The ILL is calculated for this example in the normal manner since the transition is both sharp and dry:

$$B = 4.3 \text{ feet (measured)}$$
$$ILL = B + 0.8$$
$$ILL = 4.3 + 0.8 = 5.1 \text{ feet}$$

JETPUMPED (TYPE III)

TANK	RHO-CD-213 MATERIAL LEVEL	ILL DATA GAMMA	ILL DATA NEUTRON	ILL DATA ACOUSTIC	NEUTRON PROBE END FACTOR	SURFACE DESCRIPTION/CONTENTS/COMMENTS (FROM SCANS AND RHO-CD-213)
101BY	12.2	4.7	4.7	---	.8	Saltcake with surface pools
104BY	12.9	6.4	6.4	6.4	0	Saltcake and Sludge
107BY	8.8	5.7	5.8	5.7	.8	Saltcake and Sludge/one small pool
110BY	12.6	6.3	6.4	6.3	0	Saltcake, no liquid on surface
111BY	14.5	4.1	4.0	4.1	0	Saltcake and Sludge, small pools near center of tank
112BY	9.4	2.6	2.6	2.6	0	Saltcake, no liquid on surface
102TX	7.0	3.7	3.7	3.7	0	Saltcake, no visible liquid
105TX	18.2	3.2	3.2	3.2	0	Saltcake, no visible liquid
106TX	12.3	---	6.9	6.8	.8	Saltcake, no visible liquid/complex gamma profile, not definitive
108TX	4.6	2.8	2.8	2.8	.8	Saltcake, liquid comes and goes
109TX	12.0	---	10.9/9.7	10.0/9.6	0	Surface at 12.5 feet, drained to 10.0 feet, new ILL to be 9.6 feet (gamma indicates draining saltcake)
110TX	14.2	4.3	4.3	4.2	0	Saltcake, no visible liquid
111TX	12.0	4.5	4.6	4.5	.8	Saltcake, no visible liquid
112TX	20.1	8.6	8.6	8.5	.8	Saltcake, no visible liquid
113TX	18.7	5.1	5.1	5.1	.8	Saltcake, no visible liquid
114TX	17.1	5.2	5.3	5.2	.8	Saltcake, liquid visible sometimes
115TX	17.4	5.8	5.8	5.8	.8	Saltcake, no visible liquid
117TX	17.9	3.6	3.8	3.7	0	Saltcake and diatomaceous earth, no visible liquid
118TX	17.9	4.5	4.5	4.6	0	No photos available
103TY	5.4	3.8	5.0	5.1	0	Wet Sludge, liquid visible/confirmed leaker/gamma shows ILL under wet sludge

TABLE 5-3

JETPUMPED (TYPE III)

SIMPLIFIED NEUTRON PROBE SCAN, TYPE III TANK

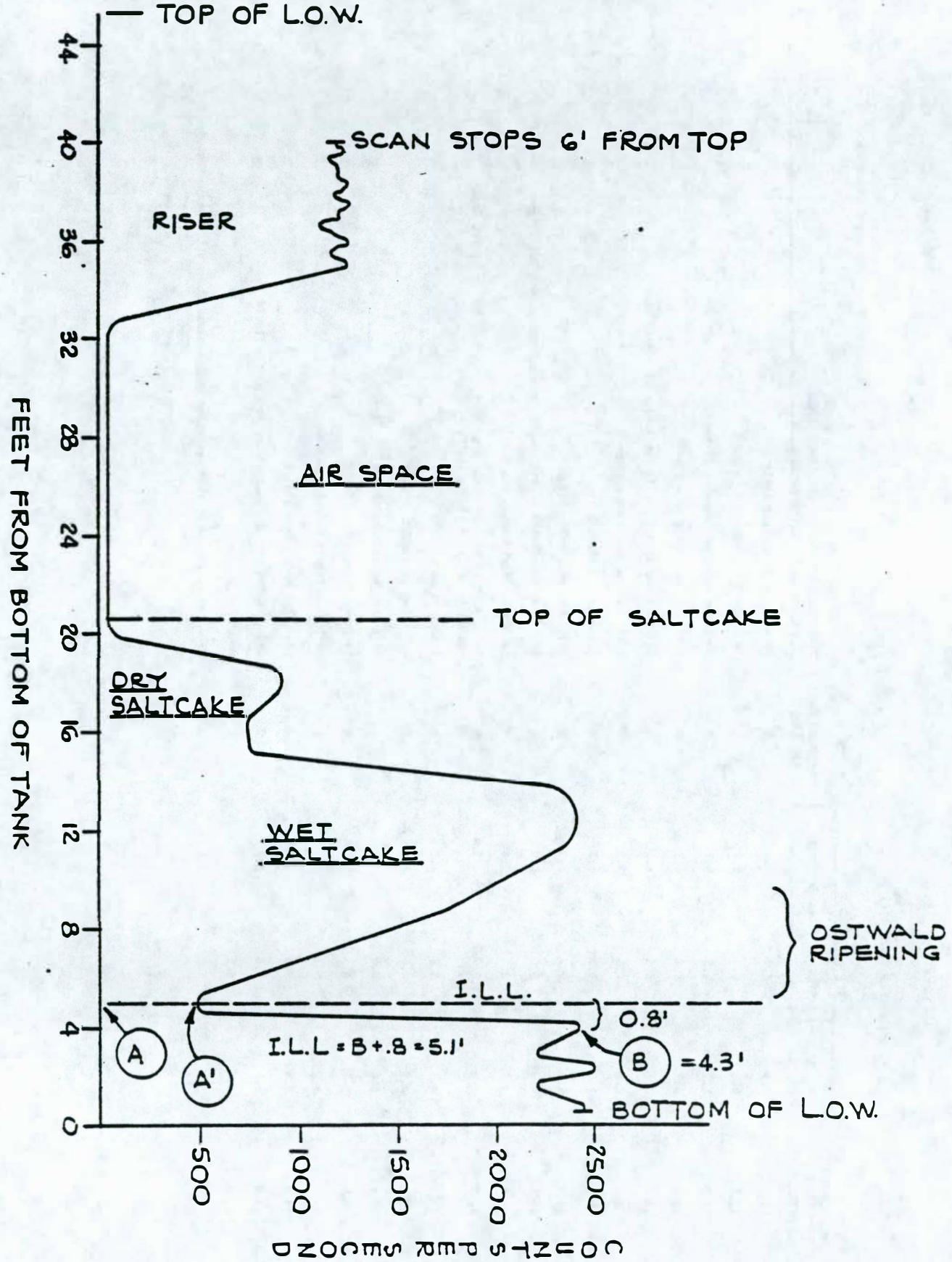


FIGURE 5.13

As the probe rises above the ILL, the count rate now increases according to the increased moisture content in the saltcake above the crystal growth zone. Note that this region can be subject to inleakage with the probability that it would not effect the ILL. However, the increased moisture content in the saltcake would be visible to the neutron probe. The rest of the scan is normal except that the very upper portion of the saltcake contains only about one-third the moisture content of the saltcake below the ILL. The mental picture must be carefully reviewed to insure that the image of the saltcake for this region is thick and solid.

As an example of an actual scan, refer to Figure 5.14 of Tank 113-TX.

B = 4.3 Feet
ILL = B + 0.8 = 4.3 + 0.8 = 5.1 feet

5.4.3 Gamma Probe Data Assessment

Figure 5.15 is a simplified sketch of a typical gamma probe scan of a Type III tank.

The gamma intensity of this tank is not as great as earlier examples. Below the ILL, in the liquid phase, the count rate is greatest. It decreases markedly at the interface of the ILL, treating the Ostwald Ripening zone much like air. Above that zone, liquid has accumulated as is shown by the rising count. The count decreases as the upper saltcake dry regions are encountered.

A fresh water intrusion would be signaled by a decreasing or depressed gamma profile in the wet saltcake above the Ostwald Region. The effect is quite discernable. The ILL probably would not be significantly effected.

As an example of an actual scan, refer to Figure 5.16 of tank 113-TX and compare this with Figure 5.14.

5.4.4 Acoustic Probe Scan

Figure 5.17 is an acoustic scan of Tank 113-TX, a Type III tank. No simplified sketch is required. There is nothing unusual about this scan. The average wet value is 0% and the average dry value is about 75%. The ILL is:

$$\text{ILL Location} = \frac{0 + 75}{2} = 37.5\%$$

ILL Value = 5.1 feet

(Note that scan is not depth calibrated)

Do not attempt to discern meaning in the "dry" data above the 5 foot transition. It has no value. Likewise, the "wet" data below the transition is essentially all free liquid. Water intrusion probably would not effect this ILL, depending on the volume of the inleakage.

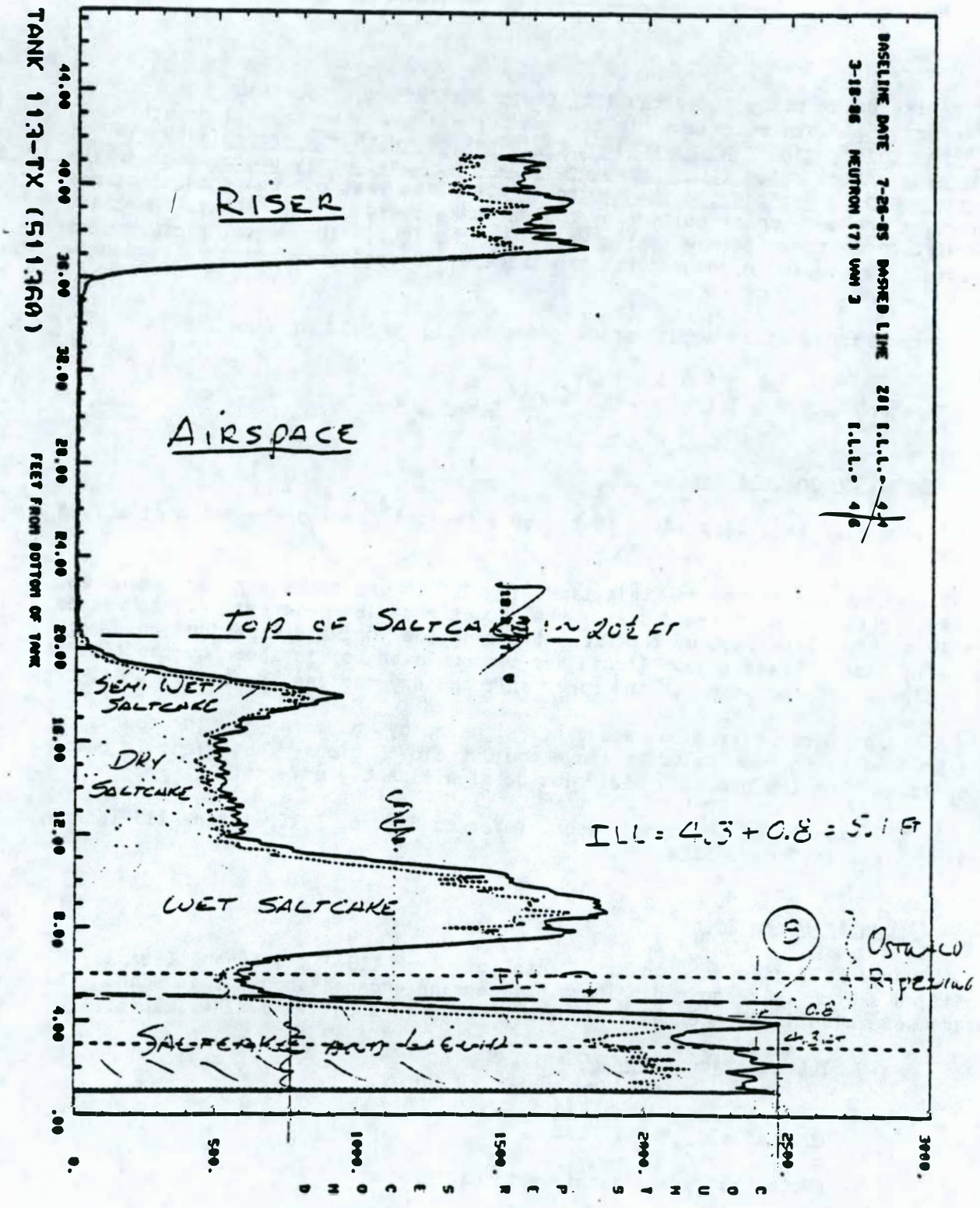

TANK 11-3-TX (511360)
RISER
AIRSPACE
Top of SALTCAKE ~ 20 ft
SEMI WET SALTCAKE
DRY SALTCAKE
WET SALTCAKE
SALTCAKE/SOLUTION LEVEL
ILL = 4.3 + 0.8 = 5.1 ft
OBSTRUCTION
BASELINE DATE 7-28-85 DASHED LINE 201 I.L.L.=4.4
3-18-86 NEUTRON (7) WM 2 I.L.L.= 4.6
FEET FROM BOTTOM OF TANK
0.
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
40.00
44.00
500.
1000.
1500.
2000.
2500.
3000.
COUNTS PER MINUTE

FIGURE 5.14

SIMPLIFIED GAMMA PROBE SCAN TYPE III TANK

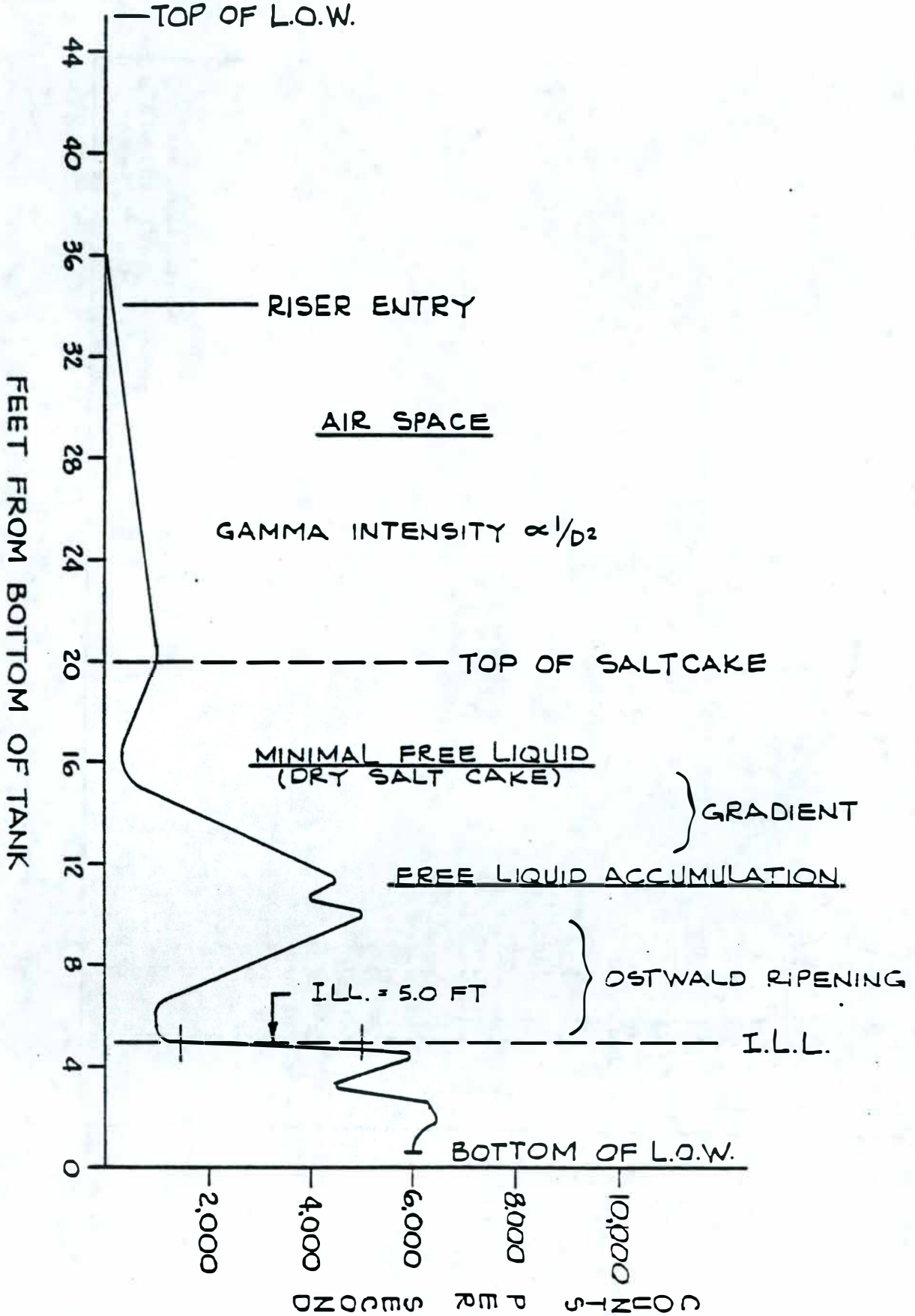


FIGURE 5.15

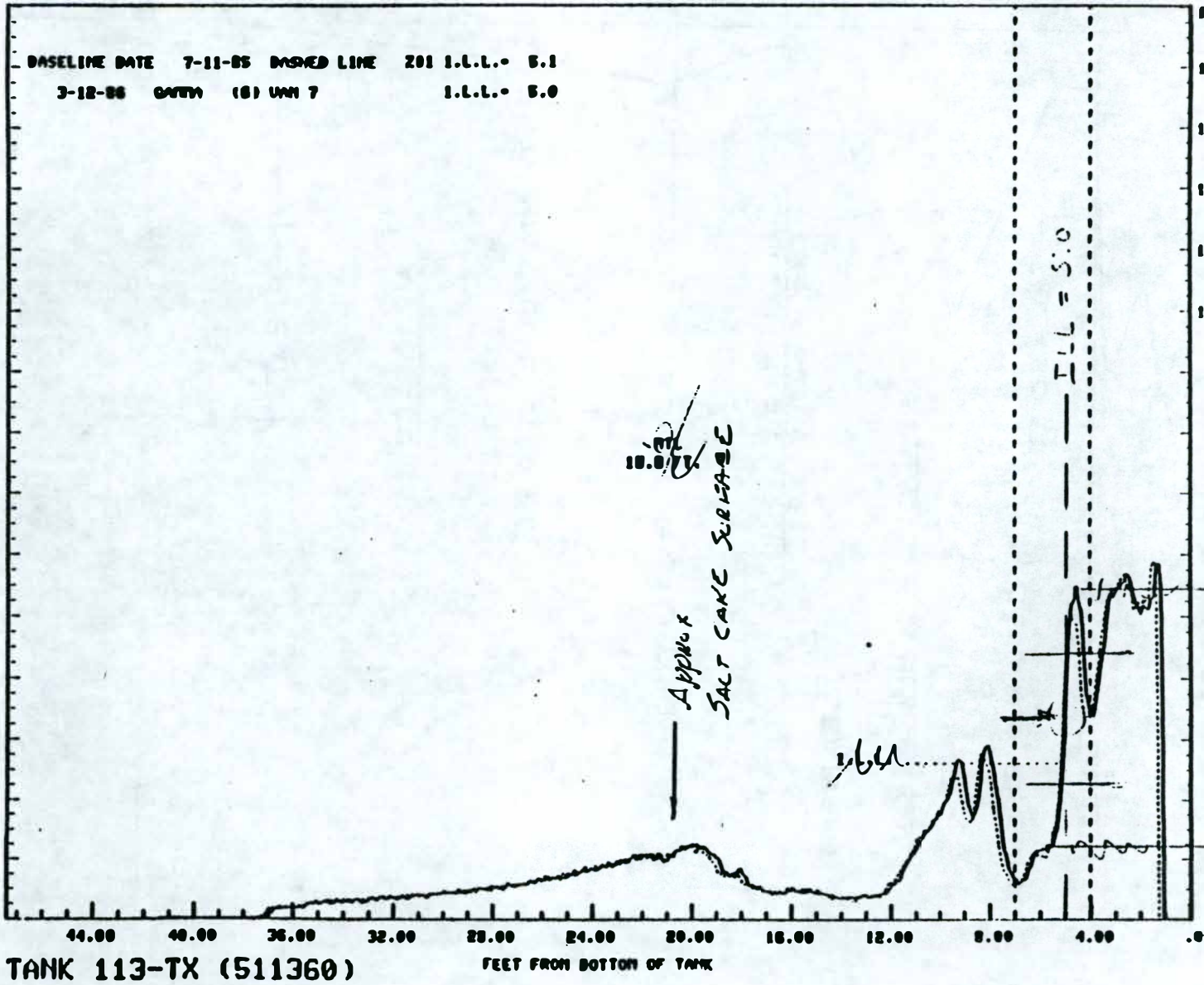

BASELINE DATE 7-11-85 DASHED LINE 201 I.L.L.= 5.1
3-12-86 DATA (8) UNI 7 I.L.L.= 5.0
I.L.L = 5.0
Approx
SALT CAKE SURFACE
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 113-TX (511360)

FIGURE 5.16

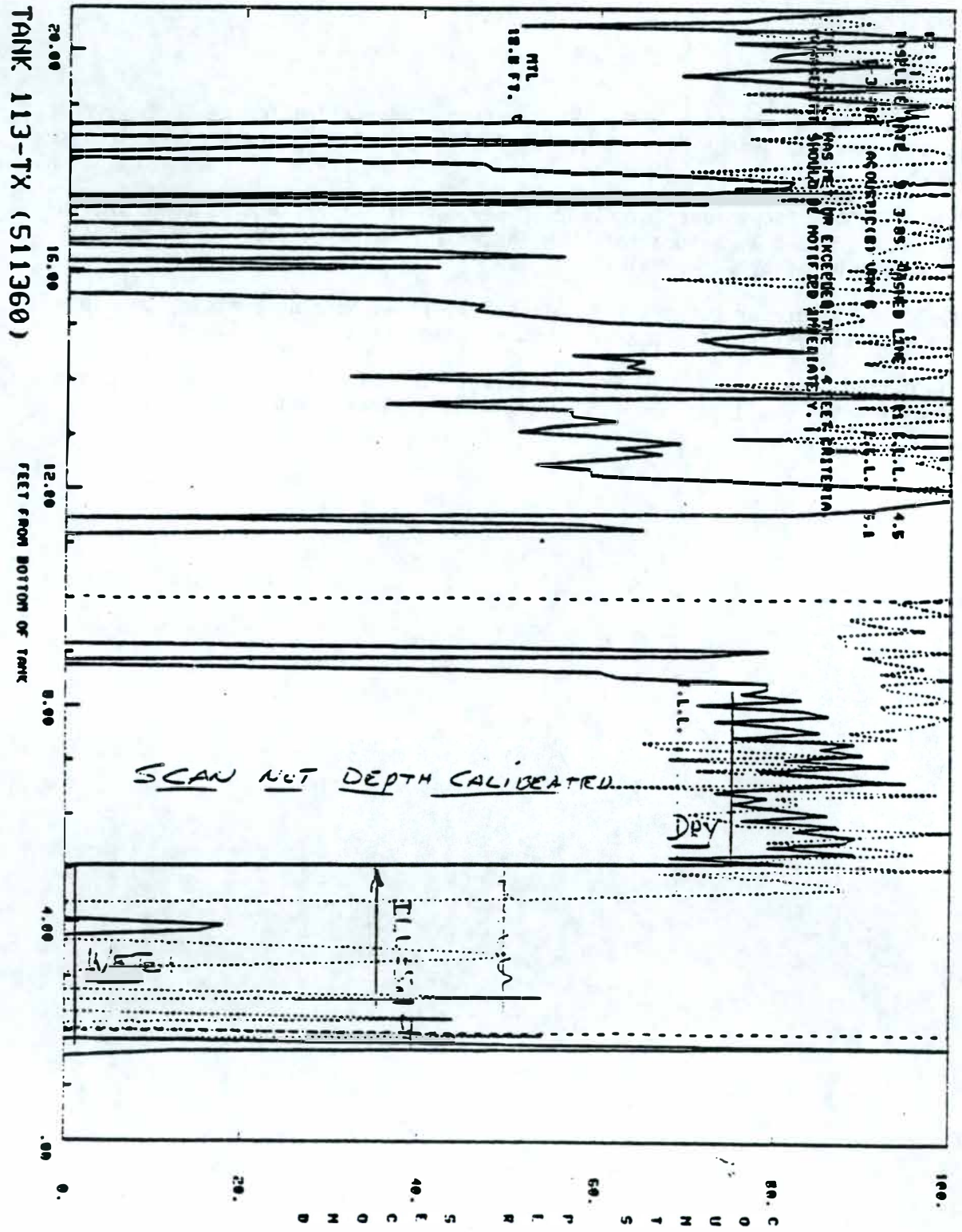

TANK 113-TX (511360)
FEET FROM BOTTOM OF TANK
20.00
16.00
12.00
8.00
4.00
.00
0.
20.
40.
60.
80.
100.
SCAN NOT DEPTH CALIBRATED
DPY
T.L.L.
4.5
5.1

FIGURE 5.17

6.0 REFERENCES

Rockwell Documents

1. RHO-RE-EV-4P, September 1982, "Supporting Information for the Scientific Basis for Establishing Drywell Monitoring Frequencies," prepared by R. E. Isaacson.

2. SD-WM-PTR-001, September 25, 1982, "Development of An Interstitial Liquid Level Measurement Technique for Use in the In-Tank Liquid Observation Wells (LOW)," prepared by C. M. Walker.

3. RHO-RE-SR-1, October 9, 1981, "In-Tank Drywell Monitoring Systems Development Report for FY-81," prepared by G. N. Langlois and F. S. Stong.

4. RHO-CD-213, December 1977, "Waste Storage Tank Status and Leak Detection Criteria - Volumes 1 through 4," prepared by S. Stalos and C. M. Walker.

APPENDIX A

INTRODUCTION

To this point, the Liquid Observation Well (LOW) monitoring system was somehow envisioned to be based principally on the acoustic scan data. This may have been due to a concept that the acoustic scan would provide a marked transition at an Interstitial Liquid Level (ILL) that was easily understood. That is, above the ILL is "dry" and below it is "wet." Unfortunately, neither "wet" nor "dry" deal directly with free liquid as does the acoustic probe. In some cases, the acoustic data is very straight forward in accordance with the simplistic view. There is, however, increasing evidence of the inability of acoustic scan data to always select a discrete ILL or to track it succinctly. This strikes at the very heart of any supposition that an acoustic ILL alone can always be used as a surveillance means. The examples of this Appendix will attempt to lead the reader through the reality of some of the data, ascertaining what it means and how it can be utilized effectively. An implicit understanding of the nature of this data is offered, together with an investigative methodology. This section should only be undertaken after thoroughly understanding the text of the document.

EXAMPLE 1: TK-110BY

The Problem:

- Establish the ILL for this tank and estimate its accuracy, using the data presented.
- Review Figures A-1.1, A-1.2, A-1.3, and A-1.4 to observe the difficulty that would be encountered by attempting to identify an ILL, based on acoustic data alone.

NEUTRON PROBE DATA

First examine the Neutron Probe Scan, provided in Figure A-1.5. Review the overall scan and note that the data is not skewed positionally, but that there is a small amplitude difference between the current scan and the baseline. The data appears acceptable.

The principal "wet" region is that maximum count rate part of this profile that averages abut 2,500 cps. This is the bottom portion of a two step moisture gradient that intersects the wet zone at 6.3 feet. Averaging out the small variations provides a simpler system for viewing (see Figure A-1.6).

The region of interest; shown in Figure A-1.5, with an ILL of 9.6 feet, has no specific meaning; as can be better seen in the pictorial. The only point of interest is the bottom of this gradient at 8.9 feet. It is very important to distinguish an ILL transition from a moisture gradient.

Finally, there appears to be less moisture content in the sludge below 2 feet and the surface of the saltcake is at approximately 14 feet.

GAMMA PROBE DATA

Next, examine the Gamma Probe Scan provided in Figure A-1.7. The data for this gamma probe scan appears valid and unshifted positionally to any significant degree. The scan's increased amplitude probably results from the installation of a new Geiger-Muller (GM) detector tube in the probe, after the baseline was determined. The region of interest set by the dotted lines is correct. The lower index is correct. The upper index is slightly too high at 10,500 cps and probably should be 10,000 cps. The evaluation of the gamma scan ILL at 6.2 feet is correct. This is a transition. However, the location noted for the ILL on the plot is quite in error. It should be located at about 7,600 cps.

Note that there is nothing of significance indicated for the moisture gradient shown by the neutron probe from 10.7 to 8.9 feet.

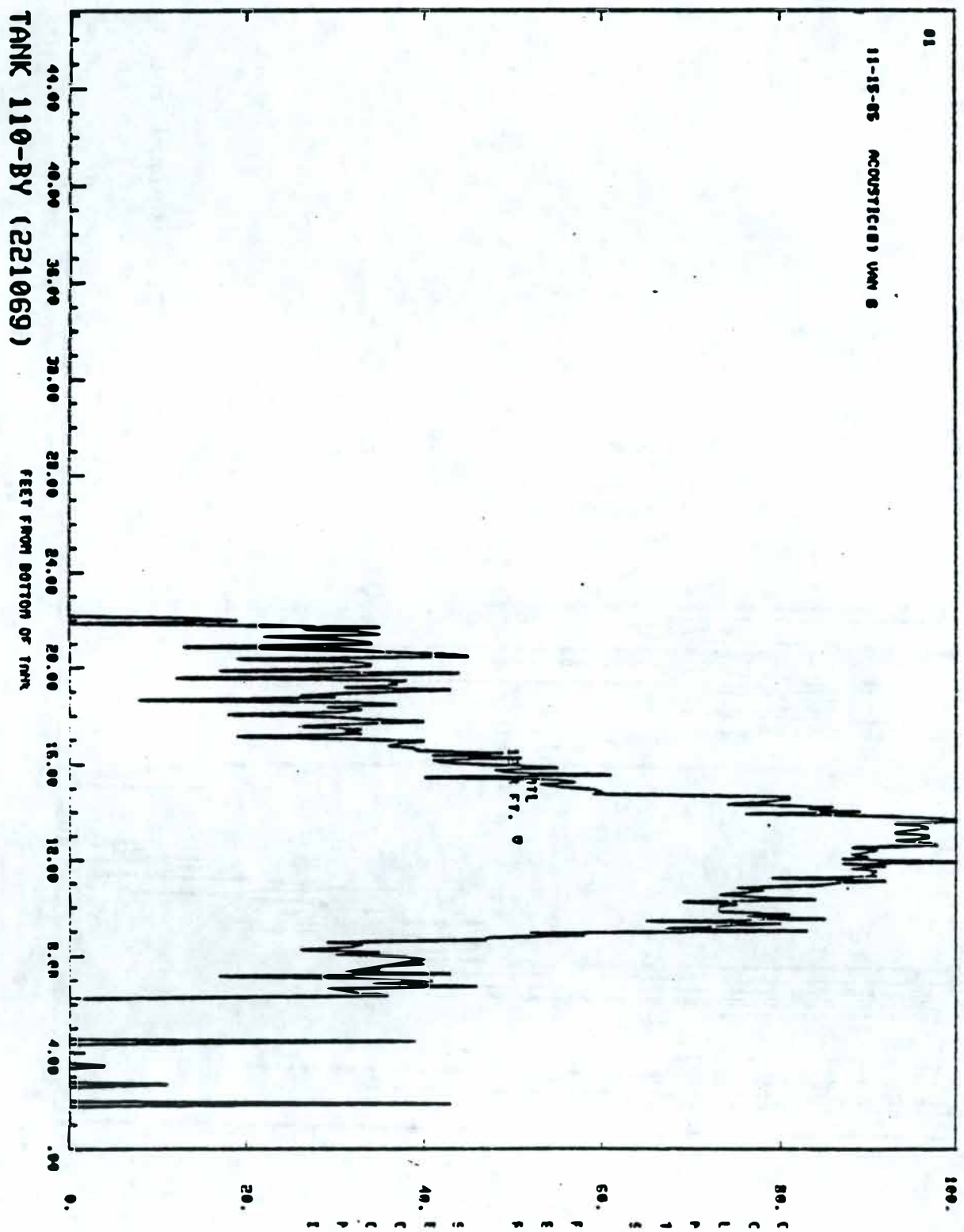

TANK 110-BY (221069)
FEET FROM BOTTOM OF TANK
11-15-95 ACOUSTICAL WAVE
Ft.
0.
20.
40.
60.
80.
100.
.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
40.00
44.00

FIGURE A-1.1

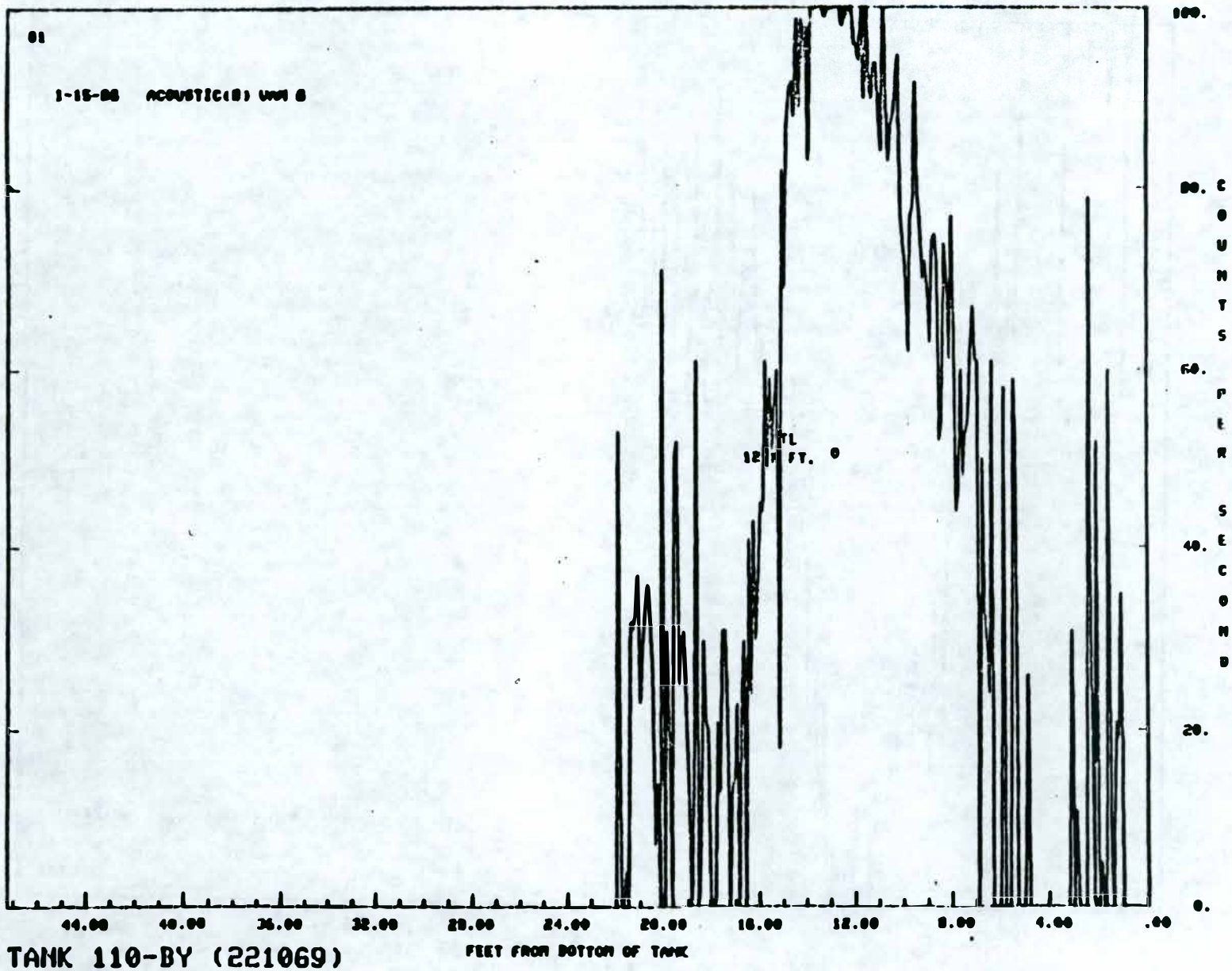

01
1-15-96 ACOUSTIC(S) UNIT 6
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 110-BY (221069)

FIGURE A-1.2

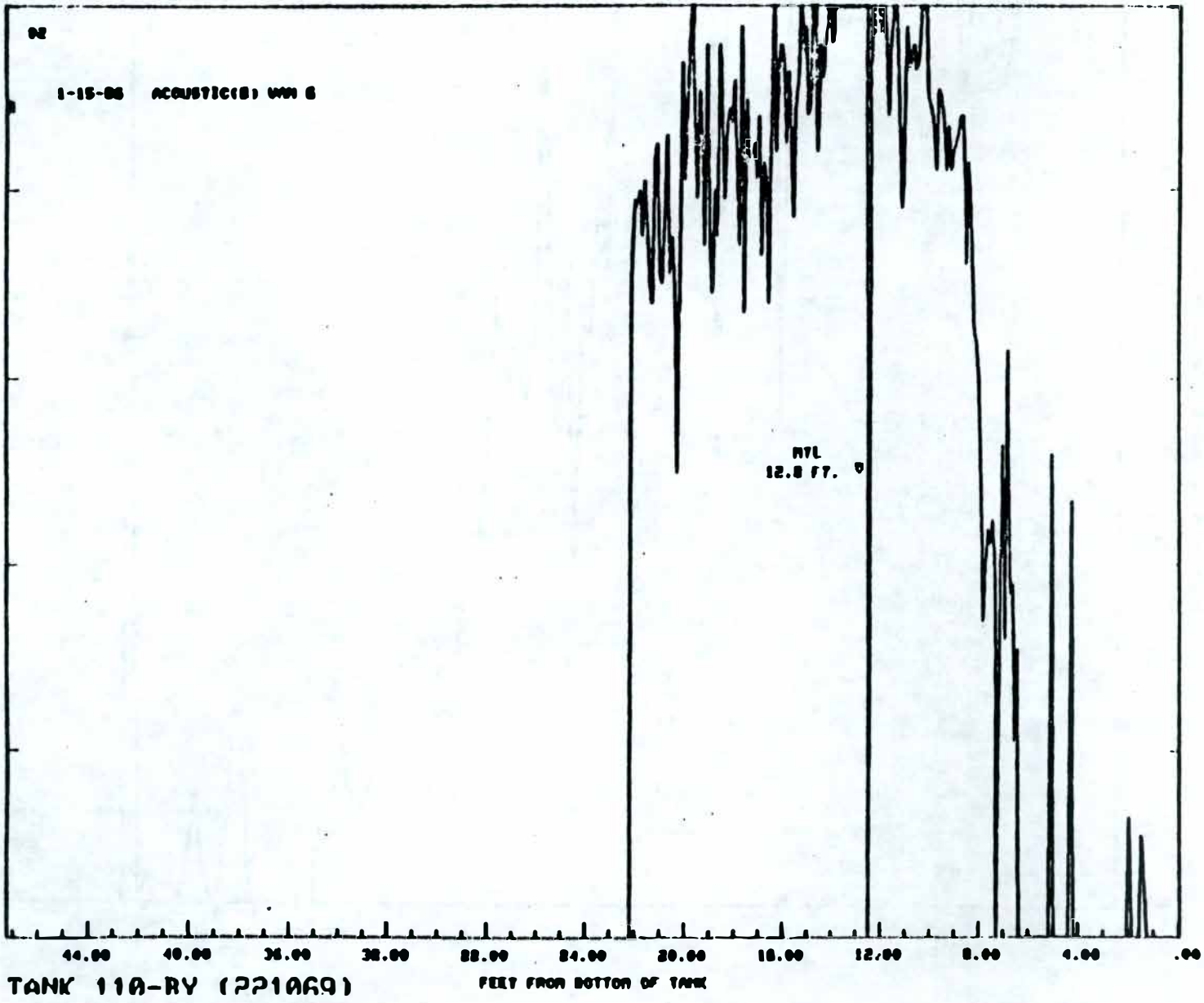

02
1-15-96 ACOUSTIC(S) WAN 6
NTL
12.8 FT.
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 110-RY (221069)
FEET FROM BOTTOM OF TANK

FIGURE A-1.3

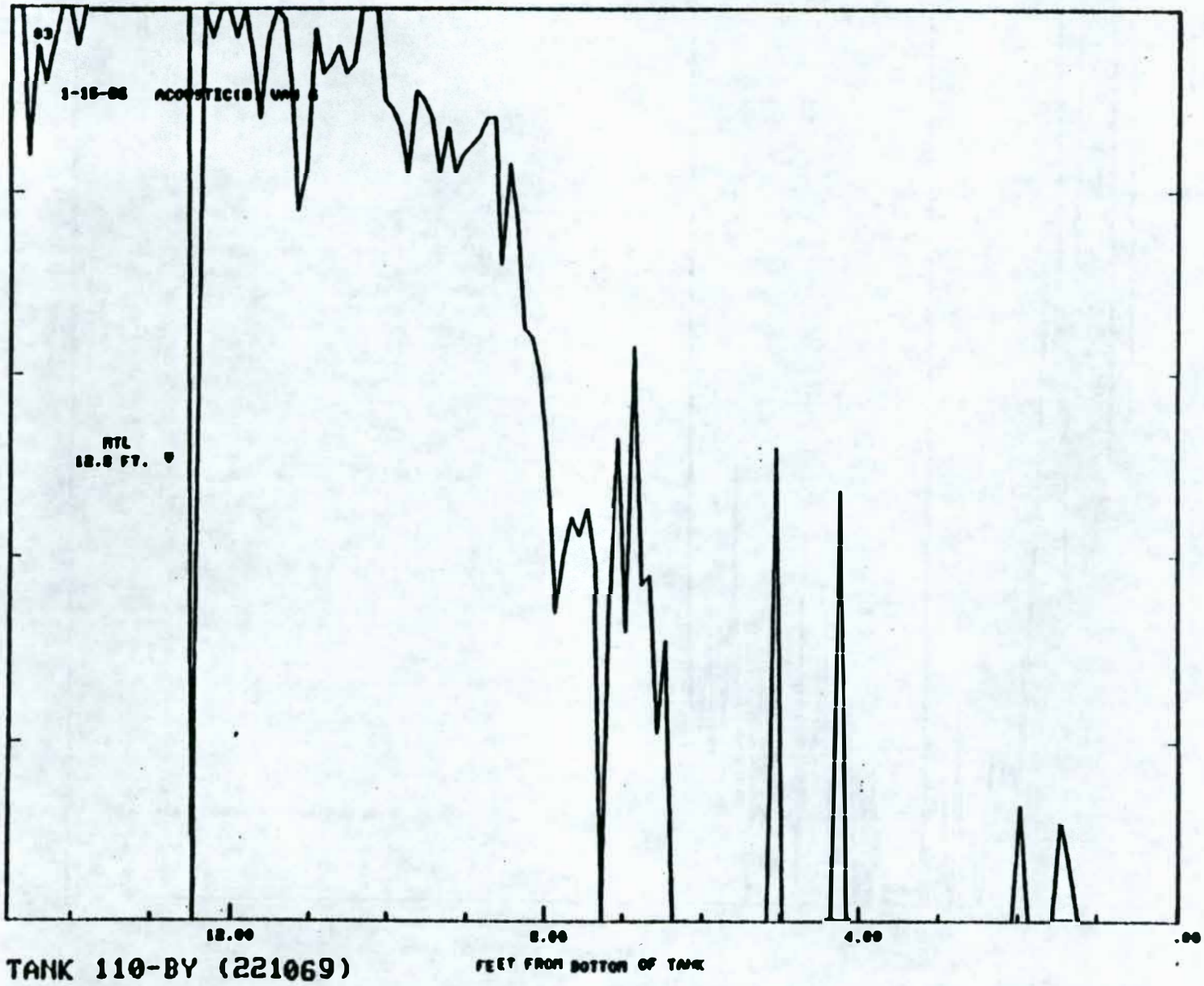

03
1-18-96 ACOUSTICIB
RTL
18.8 FT.
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
18.00
8.00
4.00
.00
TANK 110-BY (221069)
FEET FROM BOTTOM OF TANK

FIGURE A-1.4

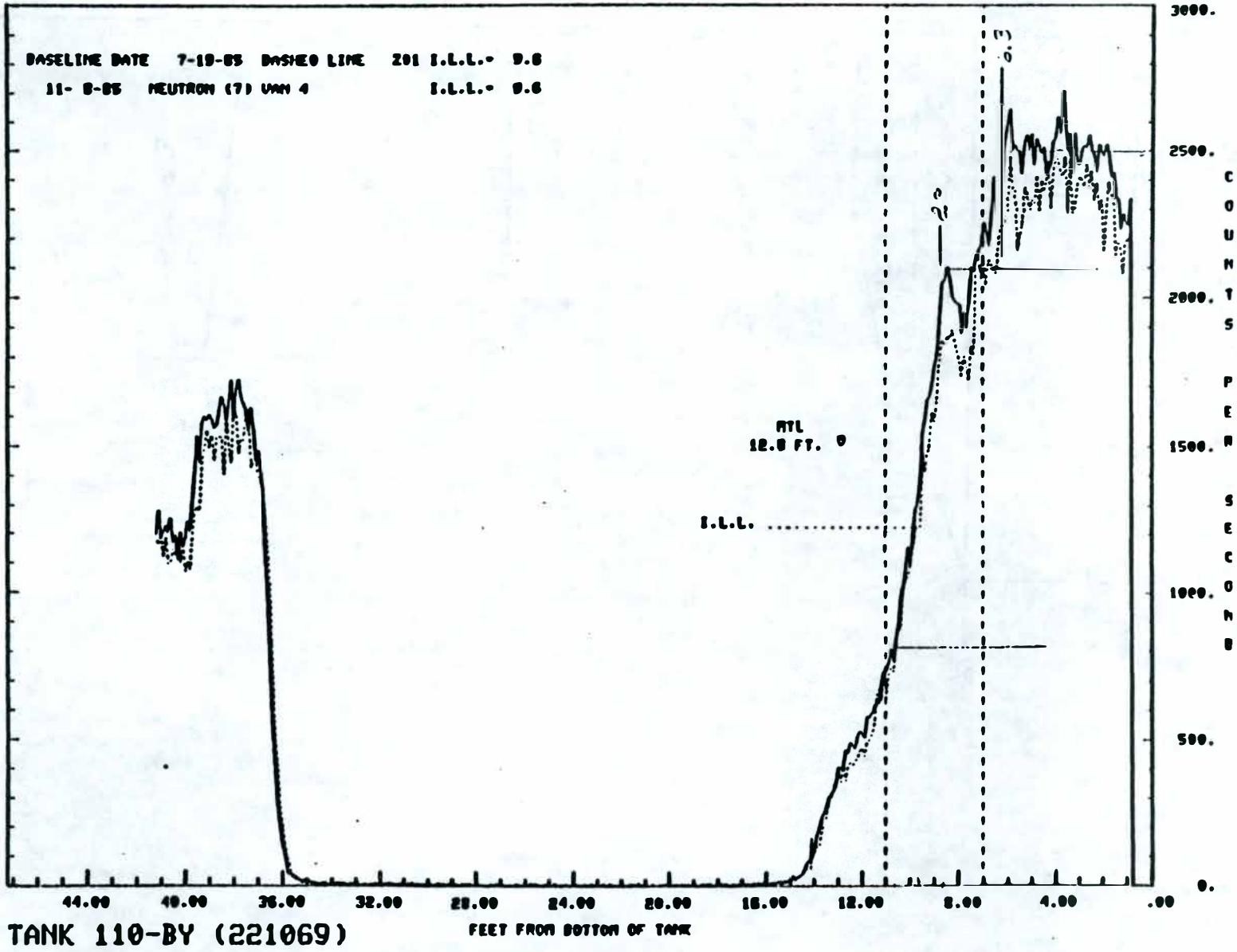

BASELINE DATE 7-19-85 BASELINE LINE 201 I.L.L.= 9.6
11- 8-85 NEUTRON (7) VAN 4 I.L.L.= 9.6
ATL
12.8 FT. 0
I.L.L.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 110-BY (221069)

FIGURE A-1.5

SIMPLIFIED SKETCH NEUTRON PROBE SCAN TK110-BY

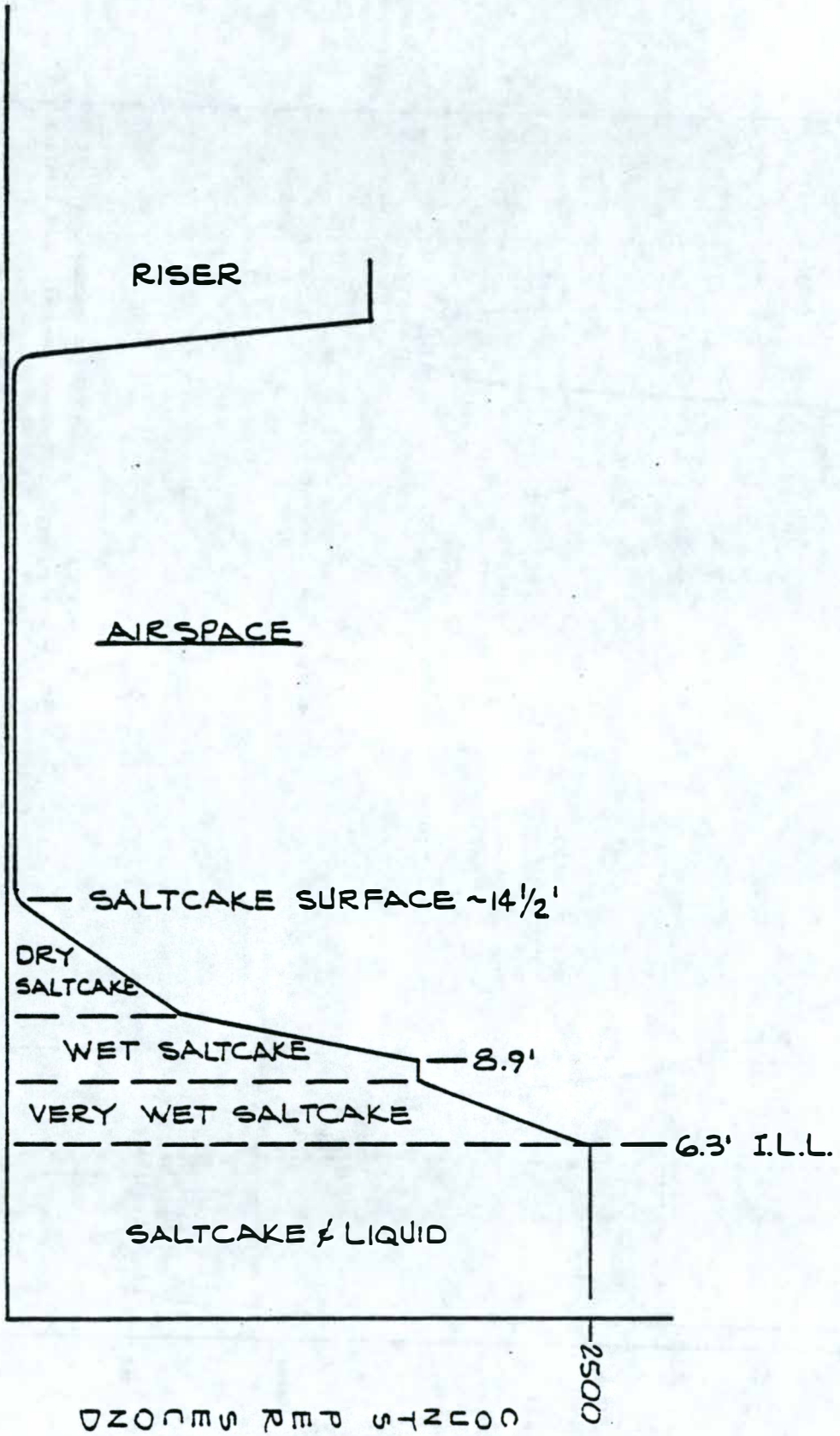


FIGURE A-1.6

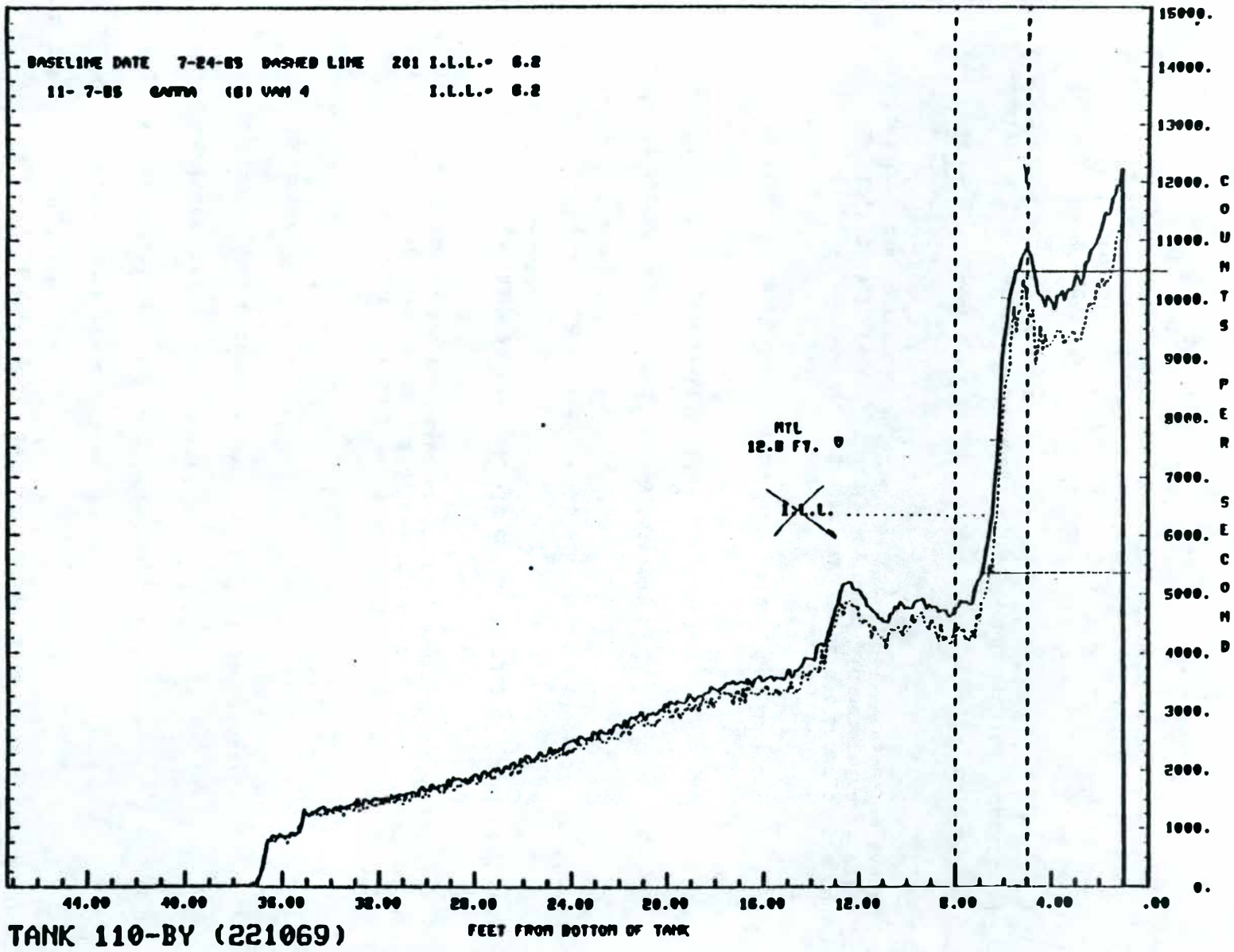

BASELINE DATE 7-24-85 DASHED LINE 201 I.L.L.= 6.2
11- 7-85 GAMMA (61) VAN 4 I.L.L.= 6.2
MTL
12.8 FT. 0
I.L.L.
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 110-BY (221069)
FEET FROM BOTTOM OF TANK

FIGURE A-1.7

Finally, the saltcake's surface is estimated at 13.5 to 14 feet. At this point, there is observed:

- o Neutron Probe (measures moisture content)

  1. Primary Gradient: 7.9 Feet to 6.3 feet.

  2. Secondary Gradient: 10.7 feet to 8.9 feet.

- o Gamma Probe (gamma activity - principally in liquid phase)

  ILL location: 6.2 feet.

ACOUSTIC PROBE DATA

Now, review the Acoustic Probe Scan, provided in Figure A-1.1. The ILL has not been determined in this example and should be done in the following way: (Note, this method must replace the value arbitrarily assigned at 50 percent [%] amplitude).

1. Position the lower index at the visually estimated mean of the "wet" noise, or at 0, in this case.

2. Position the upper index, at the break in the slope of the "dry" end transition, or about 35%, in this case.

3. The ILL is designated as being halfway between:

$$\frac{35 + 0}{2} = 17.5\% \text{ approximately } 18\%$$

4. From the scan (an expanded scale would help), the ILL is located at 6.3 feet.

5. In this particular acoustic scan, the moisture gradient shown on the neutron scan from 10.7 to 8.9 feet is clearly evident. To determine a value for this, set the lower marker at 30; the upper at 80. This value is then:

$$\frac{80 + 30}{2} = 55\%$$

and;

the value is 8.9 feet from the scan. Observe the matching location on the neutron probe scan of Figures A-1.5 and A-1.6.

It is really not meant to assign too much significance to this secondary region. It is probably still draining to the lower ILL. Only in the event that a moisture increase becomes significant at the 8.9 feet region, or the ILL increases; or both, would one begin to infer intrusion. Note: Fresh, relatively uncontaminated incoming water would suppress and lower the gamma track in this region proportional to the volume of the influx.

Discussion:

The data indicates that 110-BY has been pumped and is almost finished draining down to the ILL at 6.3 feet. If the saltcake remains stable around 8.9 feet, this region will begin drying out to form a step transition to the ILL. Note, that the gamma scan clearly delineated the principal drainage to the ILL.

Conclusion: (based only on given data)

The tank is semi-stable now, with an ILL at 6.3 feet. It is a Type III tank. The accuracy of this determination is estimated to be within the repeatability of the instrumentation. The surface of the saltcake is at approximately 14 feet and the material reference on the plots no longer serve a purpose.

NOTE: For a simplified discussion on free liquid volume, refer to the discussion section in Example 6.

EXAMPLE 2: TK-102TX

The Problem:

Reconcile an increased acoustic ILL, using the data provided.

The problem being presented is shown in the acoustic scan of Figure A-2.1 and in the expanded scale version Figure A-2.2. There is a 0.3 foot increase in the indicated acoustic ILL value compared to the baseline. Is a rescan required to establish the tank conditions?

NEUTRON PROBE DATA

Review the neutron scan of Figure A-2.3. One can see immediately that the principal portions of the two scans are overlays. The data is not shifted.

The region of interest and the assigned ILL have no value since this is not a transition, but a gradient.

Measuring as closely as possible and positioning the index at the point of constant maximum moisture (as was done previously) at 2,400 cps, the ILL is found to be 3.6 feet and is the same for the baseline. The surface of the saltcake is at about 8.5 feet.

GAMMA PROBE DATA

Review the gamma probe scan of Figure A-2.4.

An ILL has been assigned to the top of the saltcake. This, of course, only confirms where it is.

Now, look at the same gamma scan of Figure A-2.5.

The current data is nearly an overlay of the baseline and the only comment is that although the proper transition for the ILL was selected, the upper marker should be pulled back to about 8,250 cps. Still, the 3.7 value is maintained for the ILL.

ACOUSTIC PROBE DATA

Consider the acoustic ILL values assigned (Figures A-2.1 and A-2.2), and correct them to the new procedure values:

1. Baseline (9-3-85)

   a. Set the lower marker on 0.
   b. Set the upper marker on 55.
   c. The ILL is at: $\frac{55 + 0}{2} = 27.5 = 28\%$

   d. The ILL value is still 3.4.
      (Note, the transition slope is very sharp)

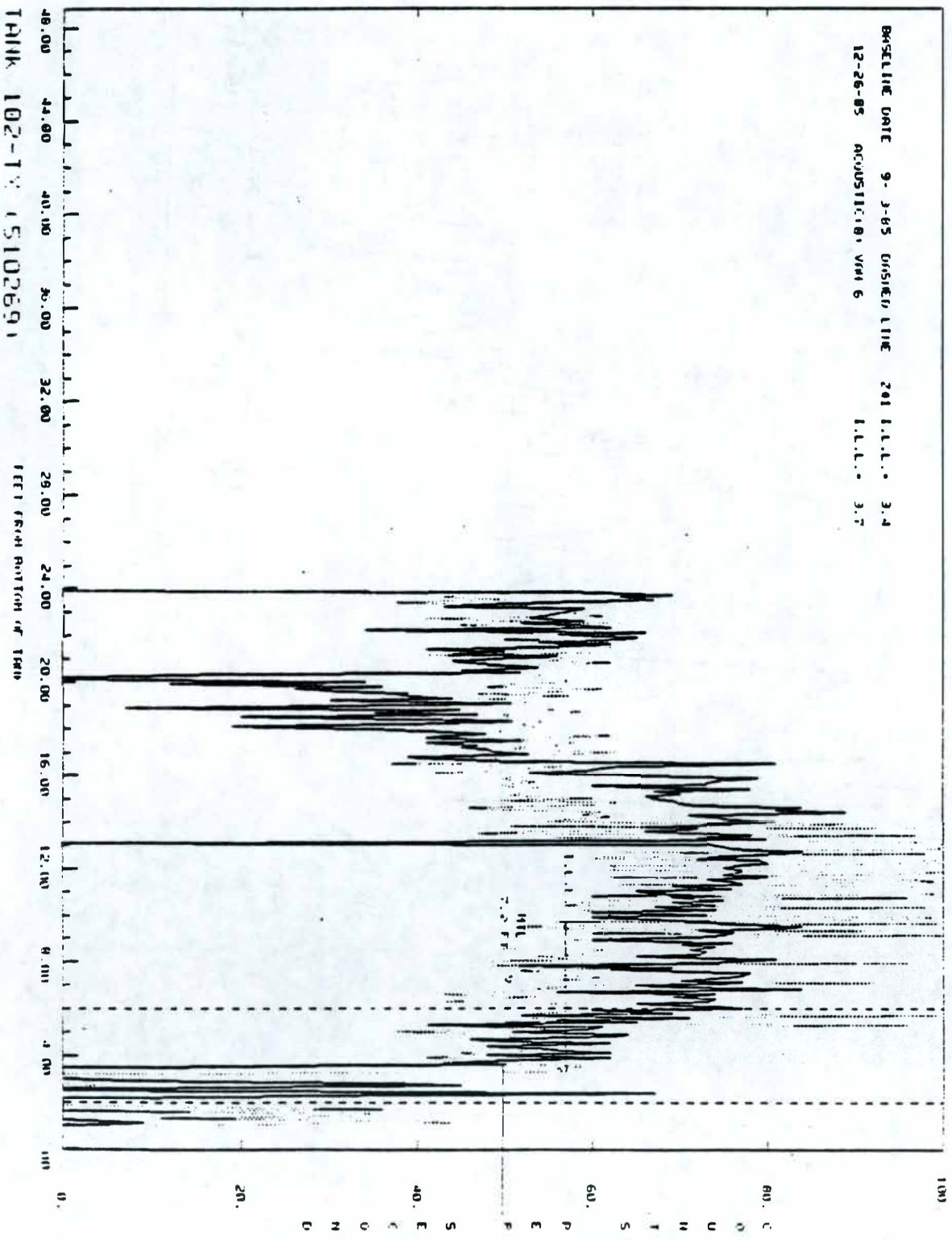

TANK 102-TY (510269)
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.000
4.000
0.
20.
40.
60.
80.
100.

FIGURE A-2.1

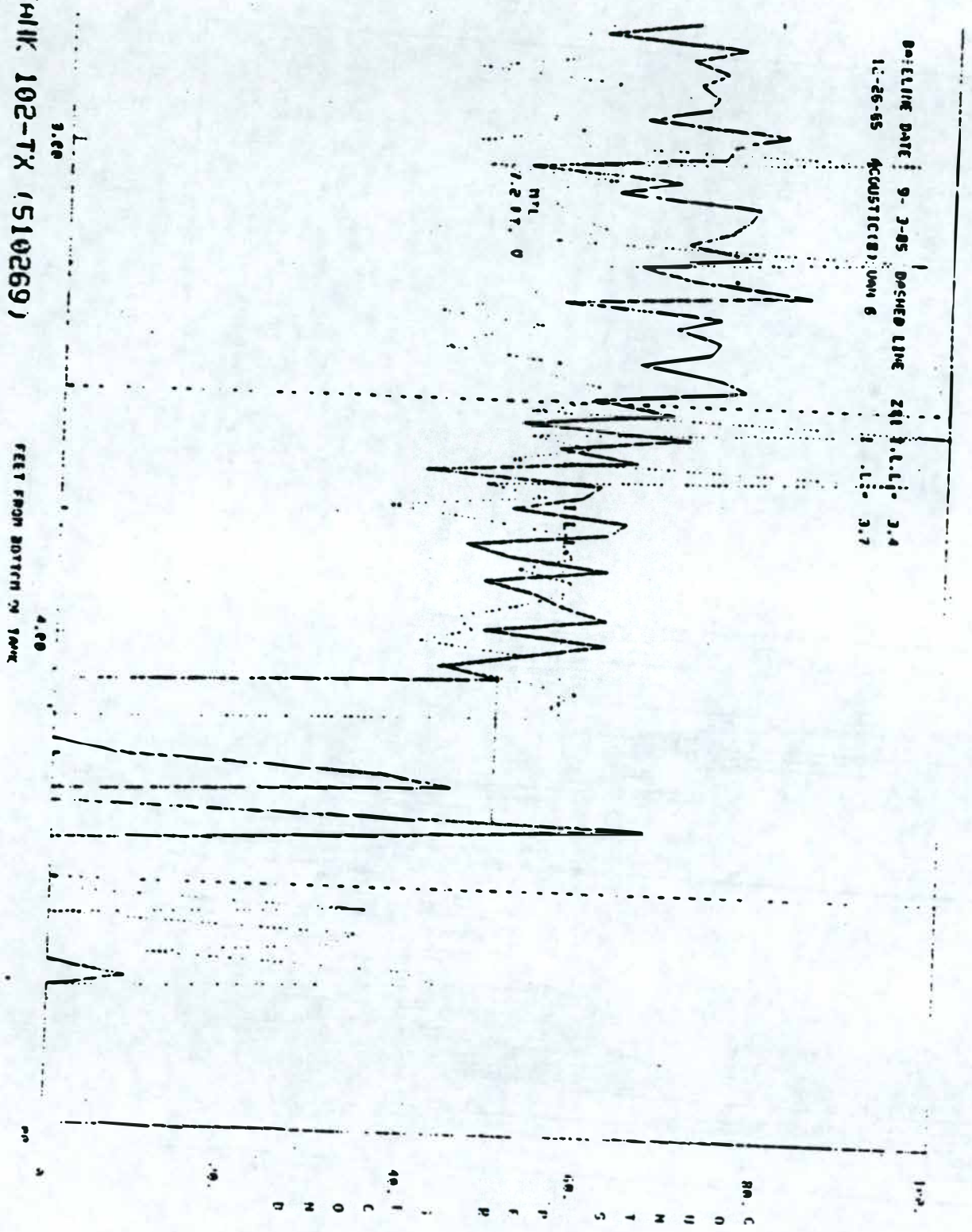

BASELINE DATE 9- 3-85 DASHED LINE
12-26-85 ACOUSTICIAN: UNIT 6
FEET FROM BOTTOM OF TANK
FHIK 102-TX (510269)

FIGURE A-2.2

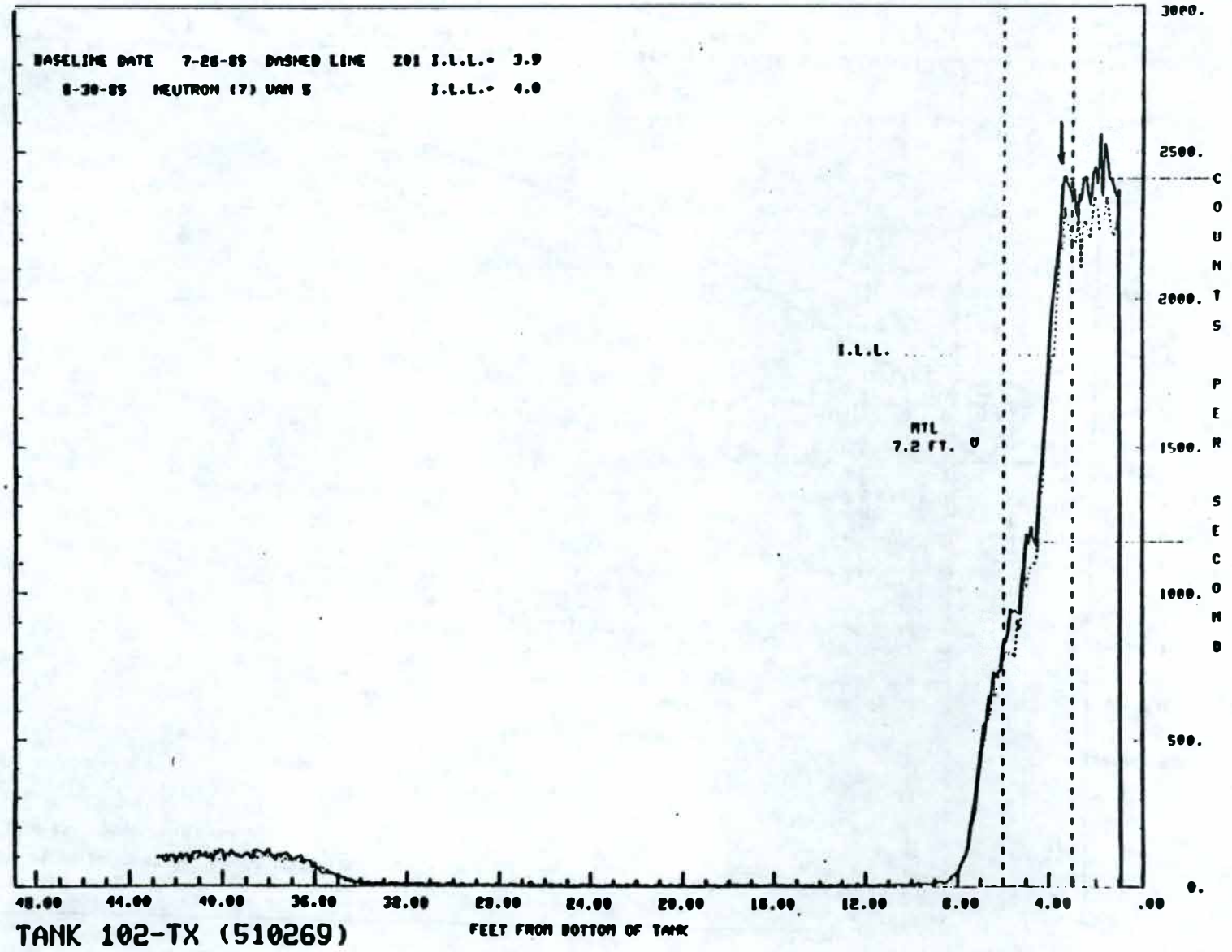

BASELINE DATE 7-26-85 DASHED LINE 201 I.L.L.= 3.9
8-30-85 NEUTRON (7) VAN 5 I.L.L.= 4.0
I.L.L.
MTL
7.2 FT. 0
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 102-TX (510269)
FEET FROM BOTTOM OF TANK

FIGURE A-2.3

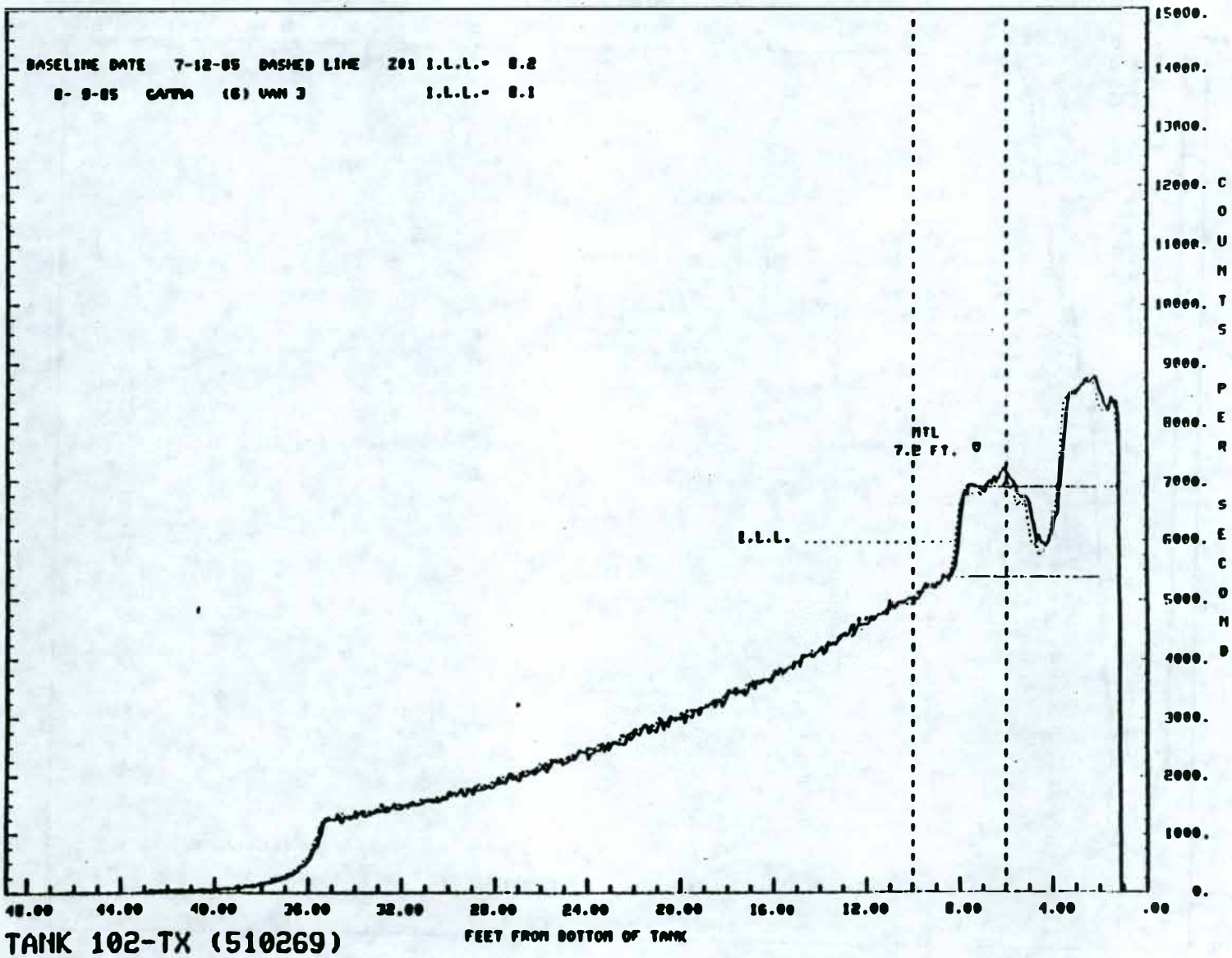

BASELINE DATE 7-12-85 DASHED LINE 201 I.L.L.= 8.2
8- 8-85 CATTA (6) VAN 3 I.L.L.= 8.1
MTL
7.2 FT. 0
I.L.L.
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 102-TX (510269)

FIGURE A-2.4

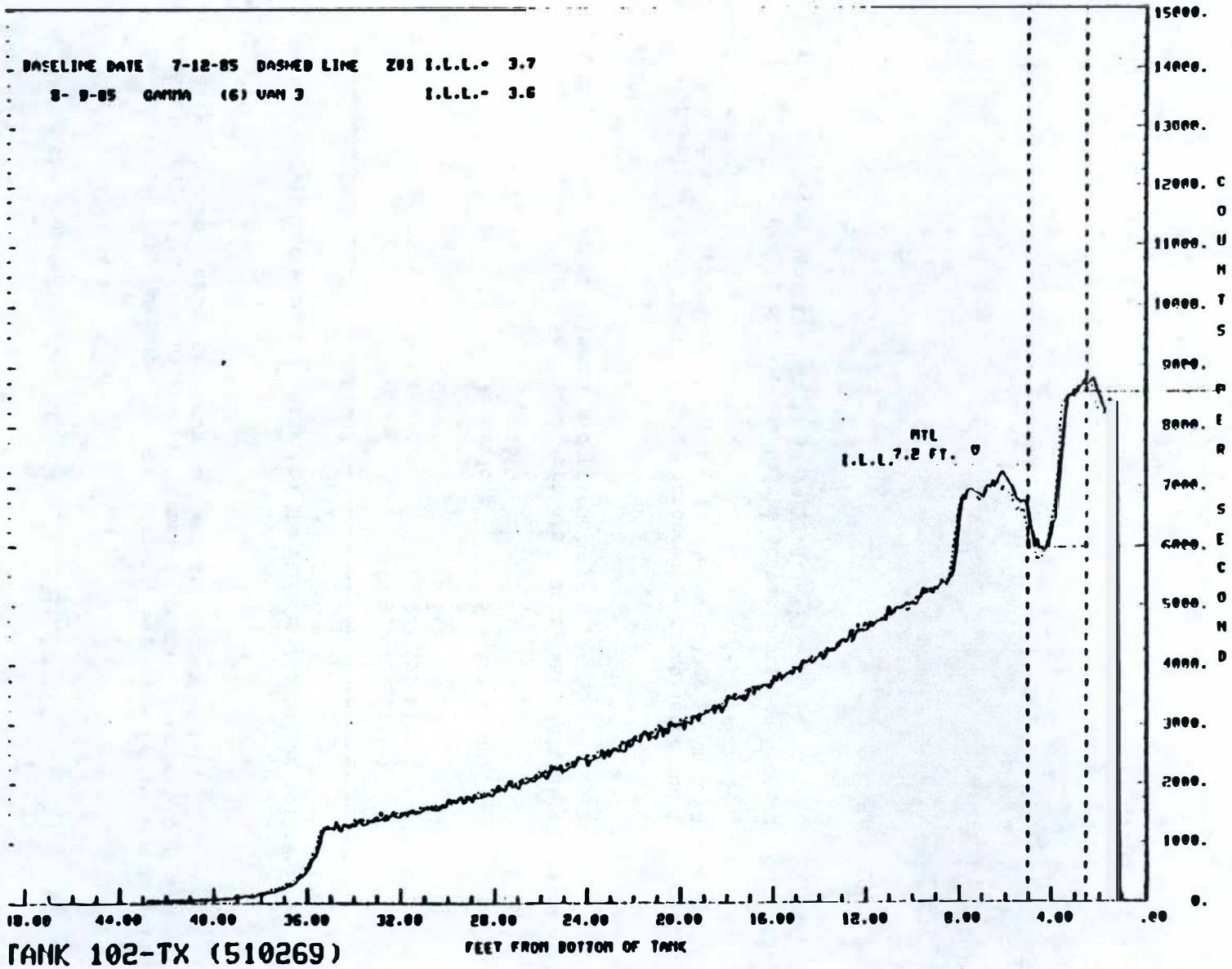

BASELINE DATE 7-12-85 DASHED LINE Z01 I.L.L.= 3.7
8- 9-85 GAMMA (6) VAN 3 I.L.L.= 3.6
ATL
I.L.L. 7.2 FT. 0
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 102-TX (510269)

FIGURE A-2.5

2. Scan (12-26-85)

a. Using the same method the ILL is at: $\frac{55 + 0}{2} = 25\%$

b. The ILL value is still 3.7.

The ILL values are now known to be correct, but there is no way to tell from acoustic data if the apparent increased depth is a result of skewed (positionally shifted) data or from an actual increased ILL.

Discussion:

We have determined with this data the the ILL was located as follows:

Date	Probe	ILL
07/12/85	Gamma	3.7 (baseline)
07/26/85	Neutron	3.7 (baseline)
08/09/85	Gamma	3.6
08/30/85	Neutron	3.7
09/03/85	Acoustic	3.4 (baseline)
12/26/85	Acoustic	3.7

Although, some of the gamma probe's data was initially evaluated incorrectly, the corrected values are confirmatory.

Conclusion:

The baseline for TK-102TX was incorrectly established for the acoustic probe at 3.4 feet on September 3, 1985. It is most likely that this data was shifted (skewed).

The agreement of all the probes, by the acoustic scan on December 26, 1985, could still be circumstantial, but it is very unlikely.

EXAMPLE 3: TK-104BY

The Problem:

- Determine the possibility that a leak from this tank might not be detected because of the variability of the data.
- Check any new data to see how it correlates with the conclusion above. (this is a reader exercise).

This tank has a significant amount of data from all probe types, most of which do not repeat well. Given this non-repeatability, can integrity assurance be determined?

NEUTRON PROBE DATA

Figures A-3.1, A-3.2, A-3.3, and A-3.4 are the available neutron probe data. Using the principal established in Example 1 to assign a neutron scan ILL, the following table values are determined: (The plot ILLs are all incorrect).

Figure	Date	Assigned ILL (Ft)
A-3.1	05/24/85	6.2
A-3.2	07/22/85	6.1
A-3.2	08/29/85	6.1
A-3.3	11/11/85	Bad Scan
A-3.4	11/19/85	6.1

Note that the moisture gradient shown in these figures is not as pronounced as in Example 1 and the surface of the saltcake is about 11 feet.

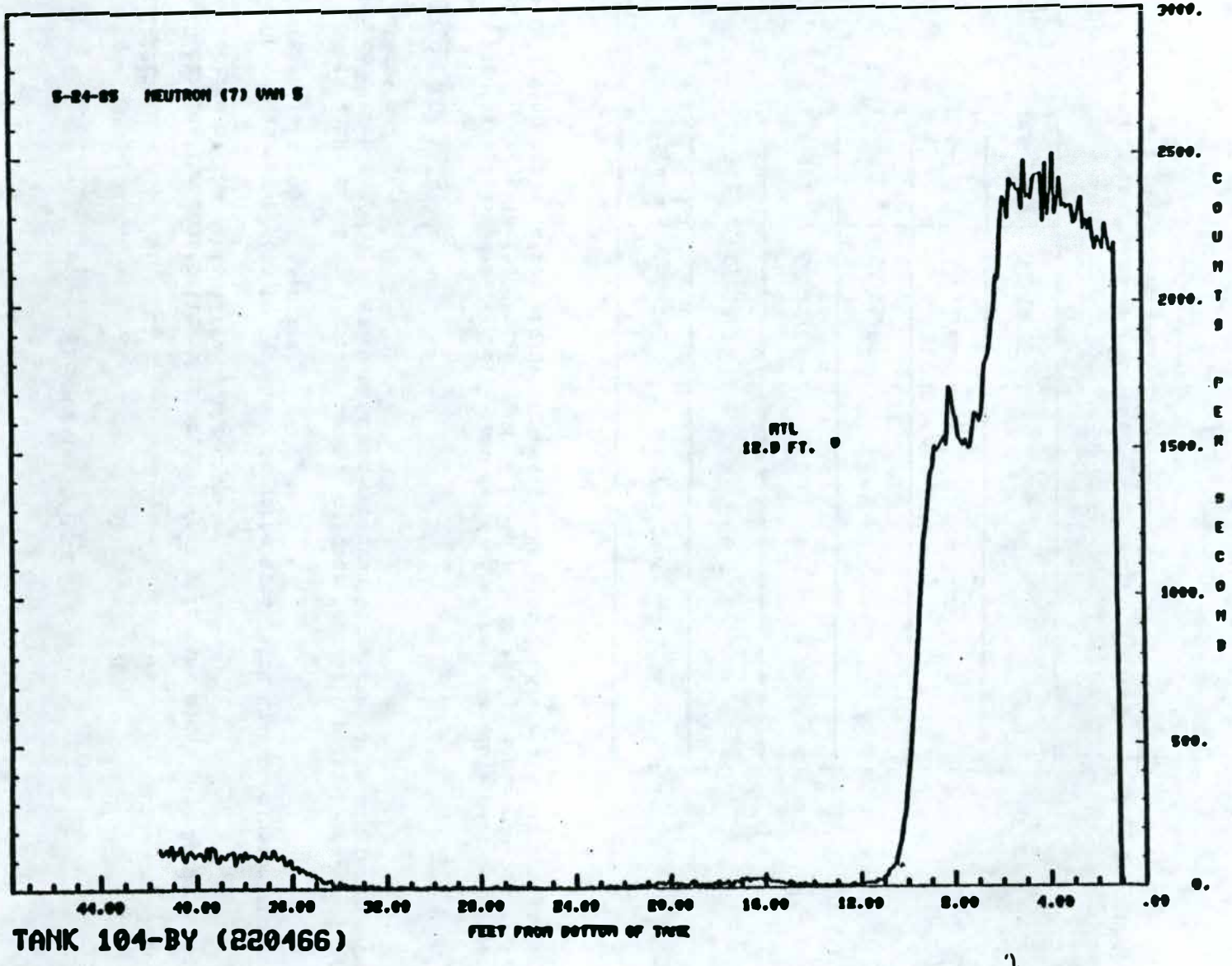

8-24-85 NEUTRON (7) VAN S
RTL
12.0 FT.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 104-BY (220466)

FIGURE A-3.1

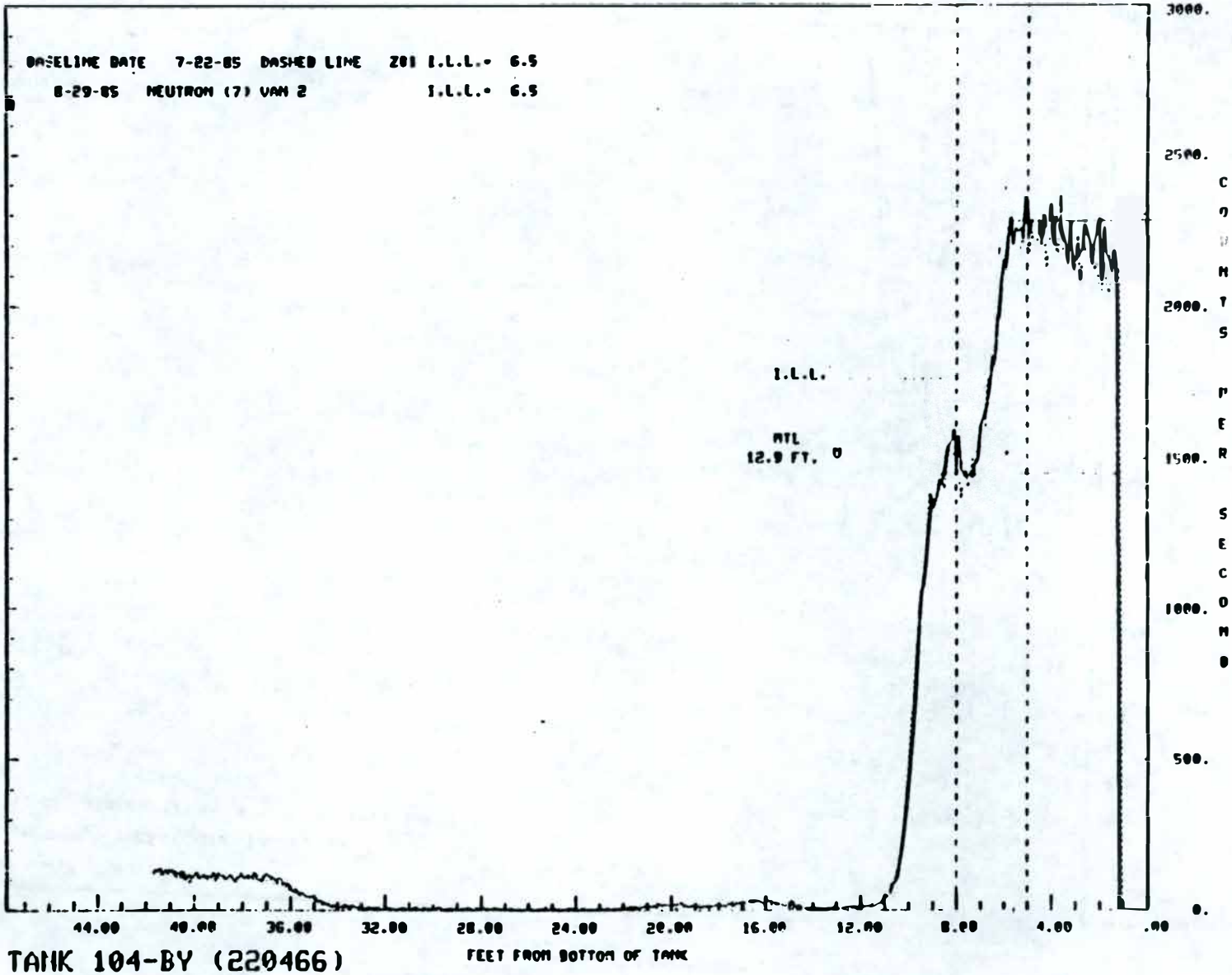

BASELINE DATE 7-22-85 DASHED LINE Z01 I.L.L.= 6.5
8-29-85 NEUTRON (7) VAN 2 I.L.L.= 6.5
I.L.L.
ATL
12.9 FT. 0
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 104-BY (220466)

FIGURE A-3.2

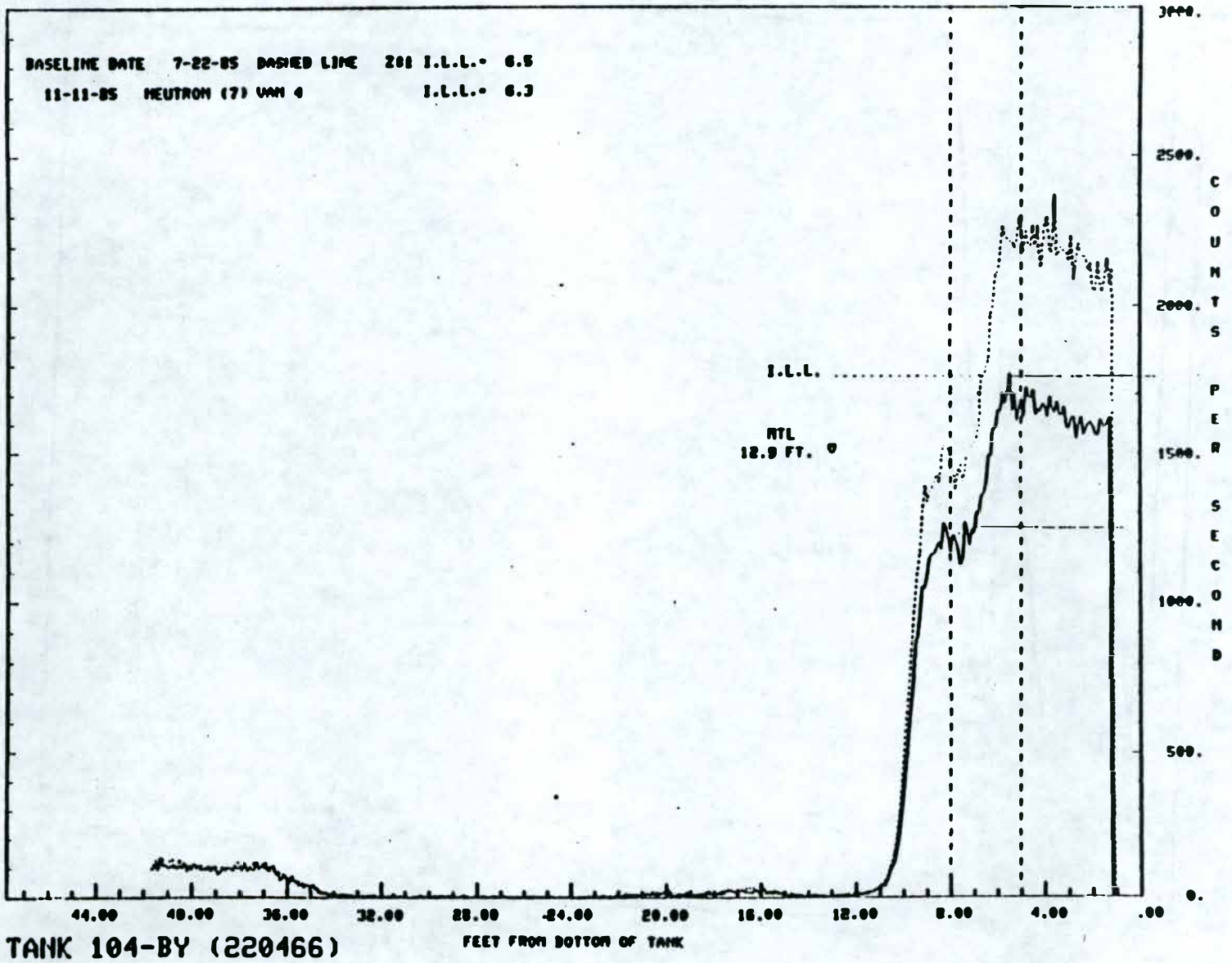

BASELINE DATE 7-22-85 DASHED LINE 28: I.L.L.= 6.5
11-11-85 NEUTRON (7) VAN 4 I.L.L.= 6.3
I.L.L.
NTL
12.9 FT. 0
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 104-BY (220466)

FIGURE A-3.3

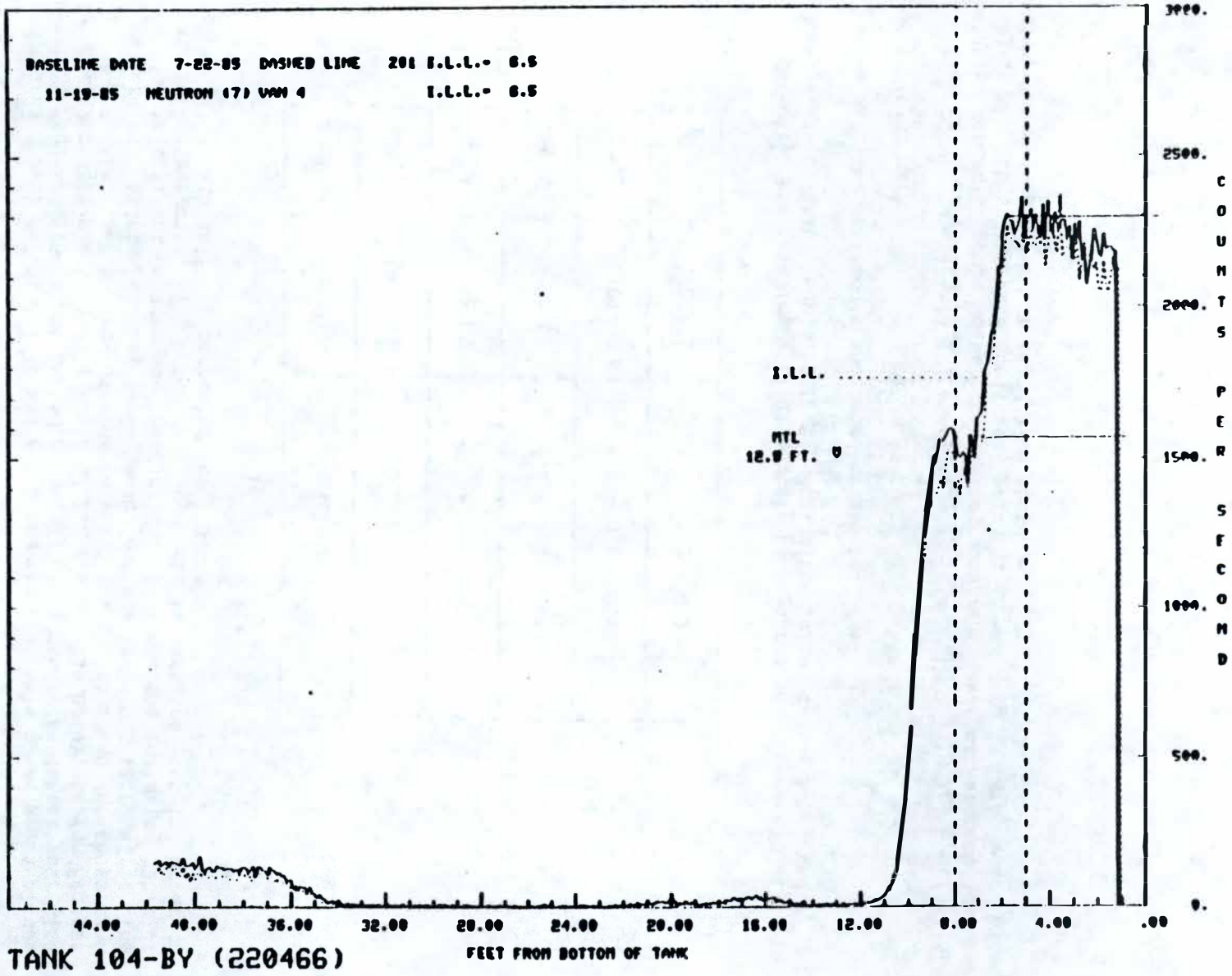

BASELINE DATE 7-22-85 DASHED LINE 201 I.L.L.= 8.5
11-19-85 NEUTRON (7) VAN 4 I.L.L.= 8.5
I.L.L.
MTL
12.0 FT. 0
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 104-BY (220466)
FEET FROM BOTTOM OF TANK

FIGURE A-3.4

GAMMA PROBE DATA

Figures A-3.5, A-3.6, A-3.7, and A-3.8 are the available gamma probe plots. Note, that Figure A-3.5 is not scaled correctly or is otherwise defective. Also note, that it starts plotting at a depth of 1.2 feet. The baselines for Figures A-3.6, A-3.7, and A-3.8 are plotted at 1.2 feet. The scans for these same figures are all started at 1.4 feet, which amounts to a 0.2 foot shift. The reason for this is not determined. Keeping this in mind, the following table of ILL data is constructed. The upper and lower ILL markers are set too broad on the plots. The data shift is corrected for the table.

Figure	Scan Date	ILL (Ft)
A-3.5	05/31/85	6.3
A-3.6	07/23/85	6.3
A-3.6	09/26/85	6.6 - 0.2 = 6.4
A-3.7	11/07/85	6.5 - 0.2 = 6.3
A-3.8	01/07/86	6.4 - 0.2 = 6.2

Obviously, the baseline will ultimately be adjusted and the result will be an average of 6.5 feet, not 6.3 feet! But, either case can be supported.

The saltcake surface is indicated at about 11 feet.

ACOUSTIC PROBE DATA

Figures A-3.9, A-3.10, A-3.11, A-3.12 A&B, and A-3.13 A&B provide the available acoustic probe data. Use the upper and lower marker technique to establish the ILL at the mean amplitude percent; as was done in Example 1. The resulting data is provided in the following table:

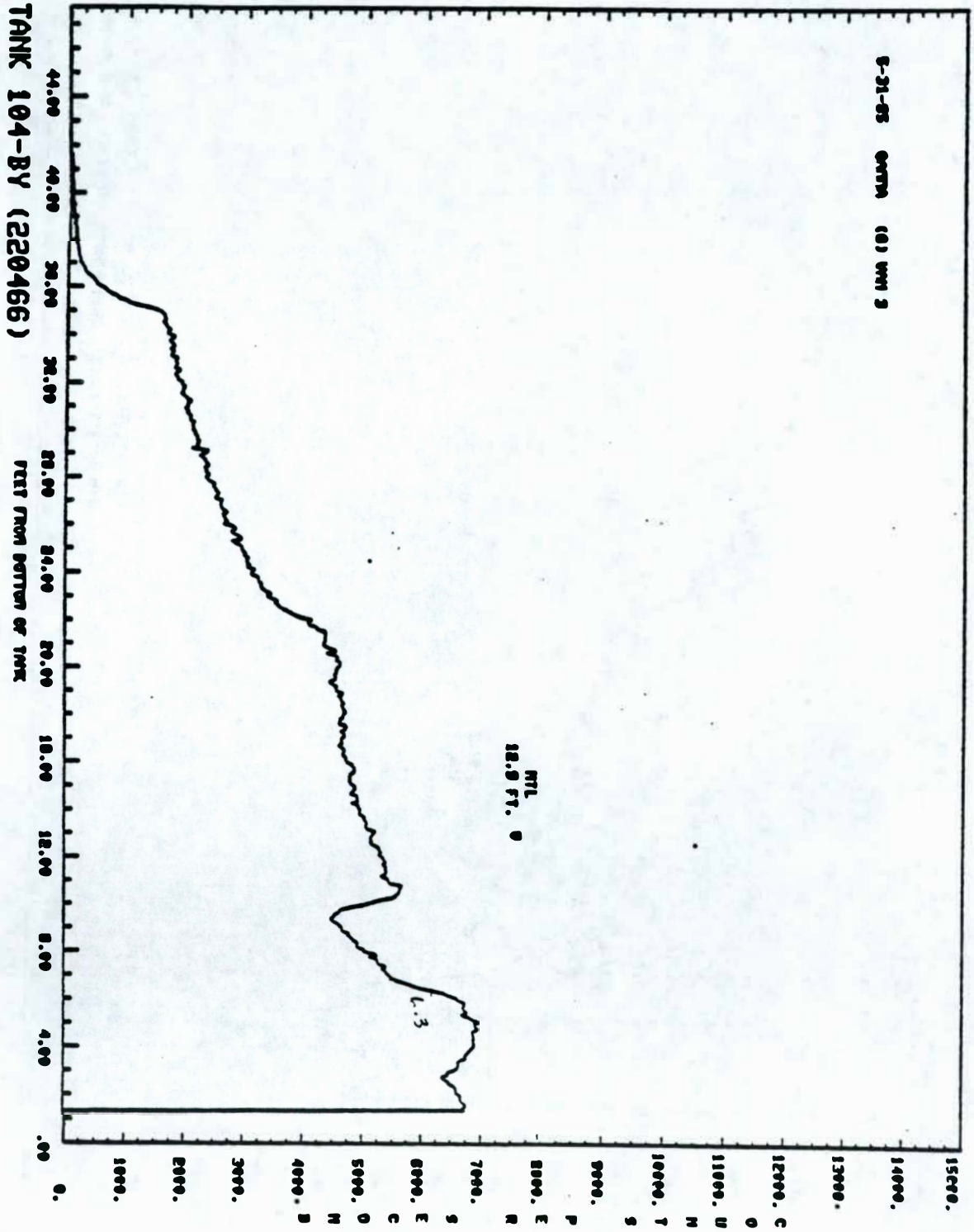

TANK 104-BY (220466)
FEET FROM BOTTOM OF TANK
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
0.
1000.
2000.
3000.
4000.
5000.
6000.
7000.
8000.
9000.
10000.
11000.
12000.
13000.
14000.
15240.
L.3
MTL
18.0 FT. 0

FIGURE A-3.5

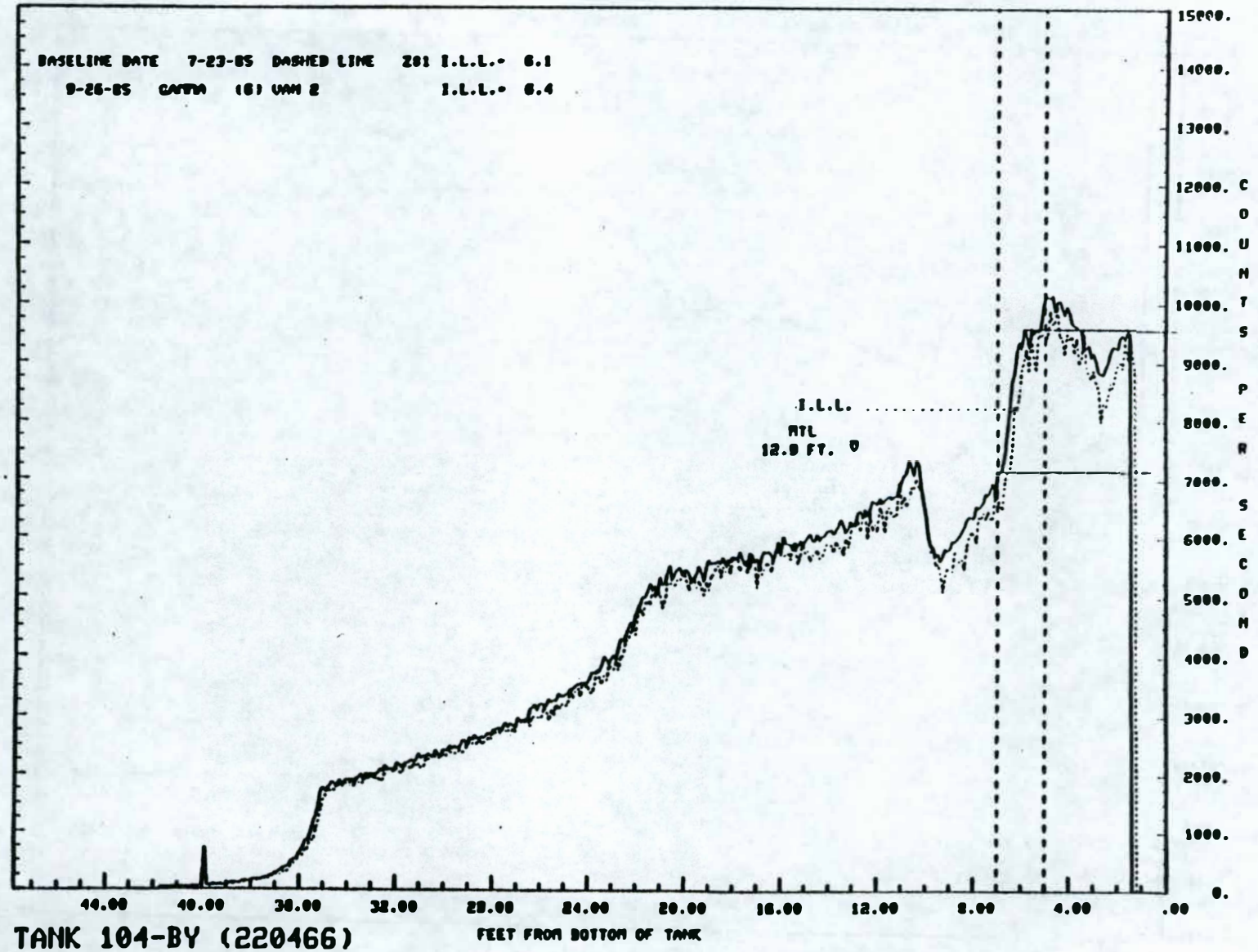

BASELINE DATE 7-23-85 DASHED LINE 281 I.L.L.= 6.1
9-26-85 GAMMA (6) UNN 2 I.L.L.= 6.4
I.L.L.
ATL
12.9 FT. 0
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 104-BY (220466)
FEET FROM BOTTOM OF TANK

FIGURE A-3.6

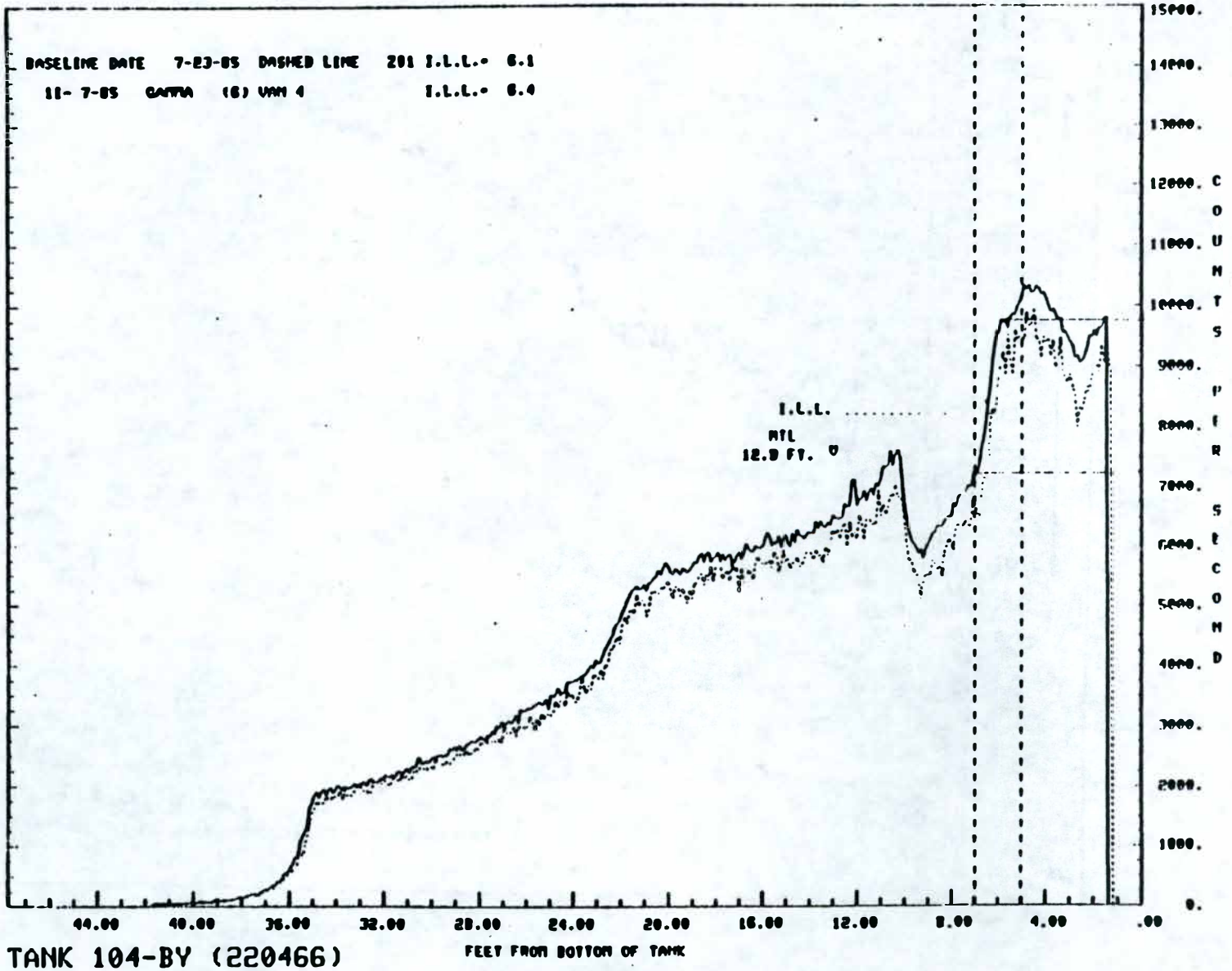

BASELINE DATE 7-23-85 DASHED LINE 201 I.L.L.= 6.1
11- 7-85 GAMMA (6) VAH 4 I.L.L.= 6.4
I.L.L.
ATL
12.8 FT. 0
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 104-BY (220466)

FIGURE A-3.7

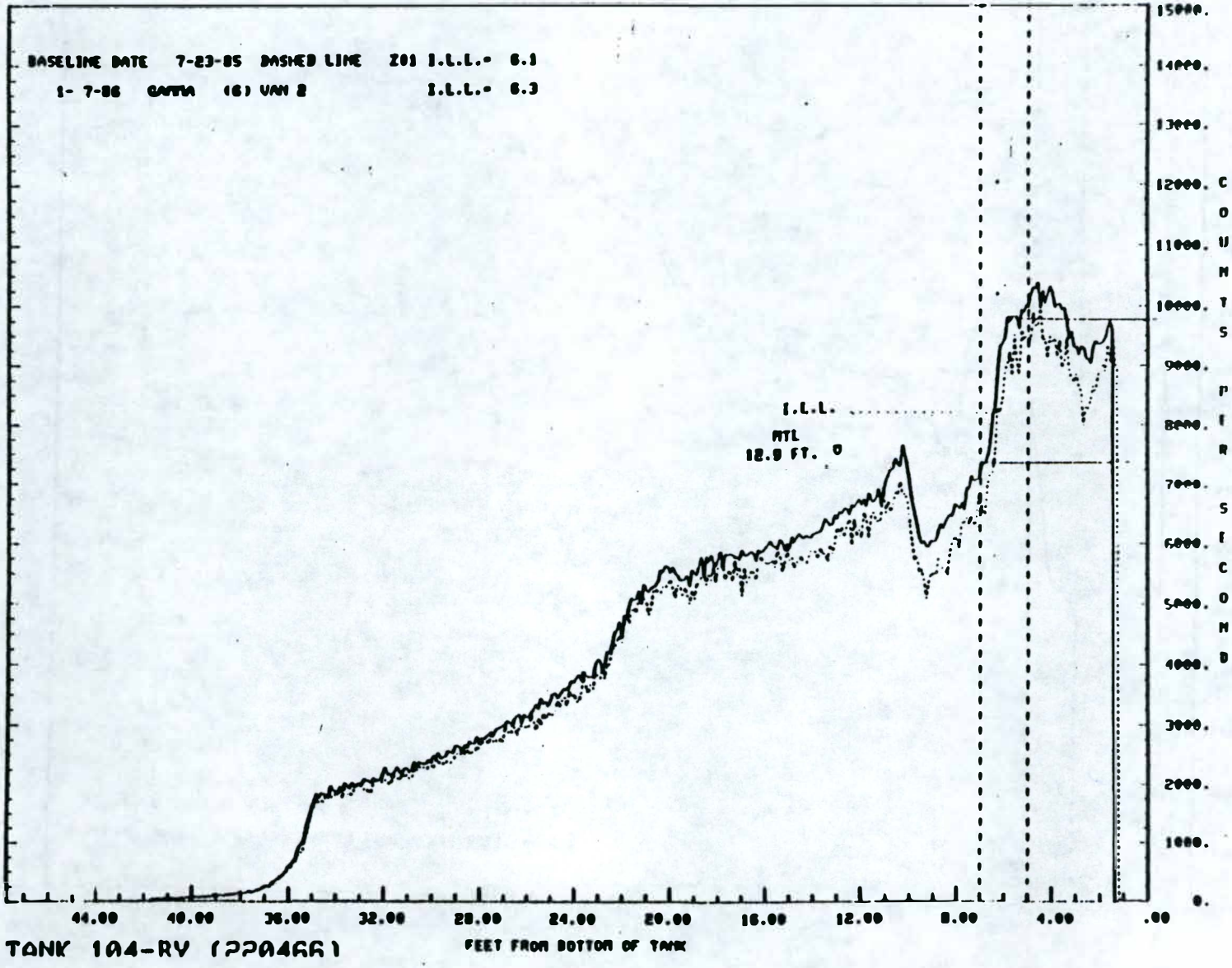

BASELINE DATE 7-23-85 DASHED LINE Z01 I.L.L.= 6.1
1- 7-86 GAMMA (6) VAN 8 I.L.L.= 6.3
I.L.L.
MTL
12.9 FT. 0
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 104-RY (220466)
FEET FROM BOTTOM OF TANK

FIGURE A-3.8

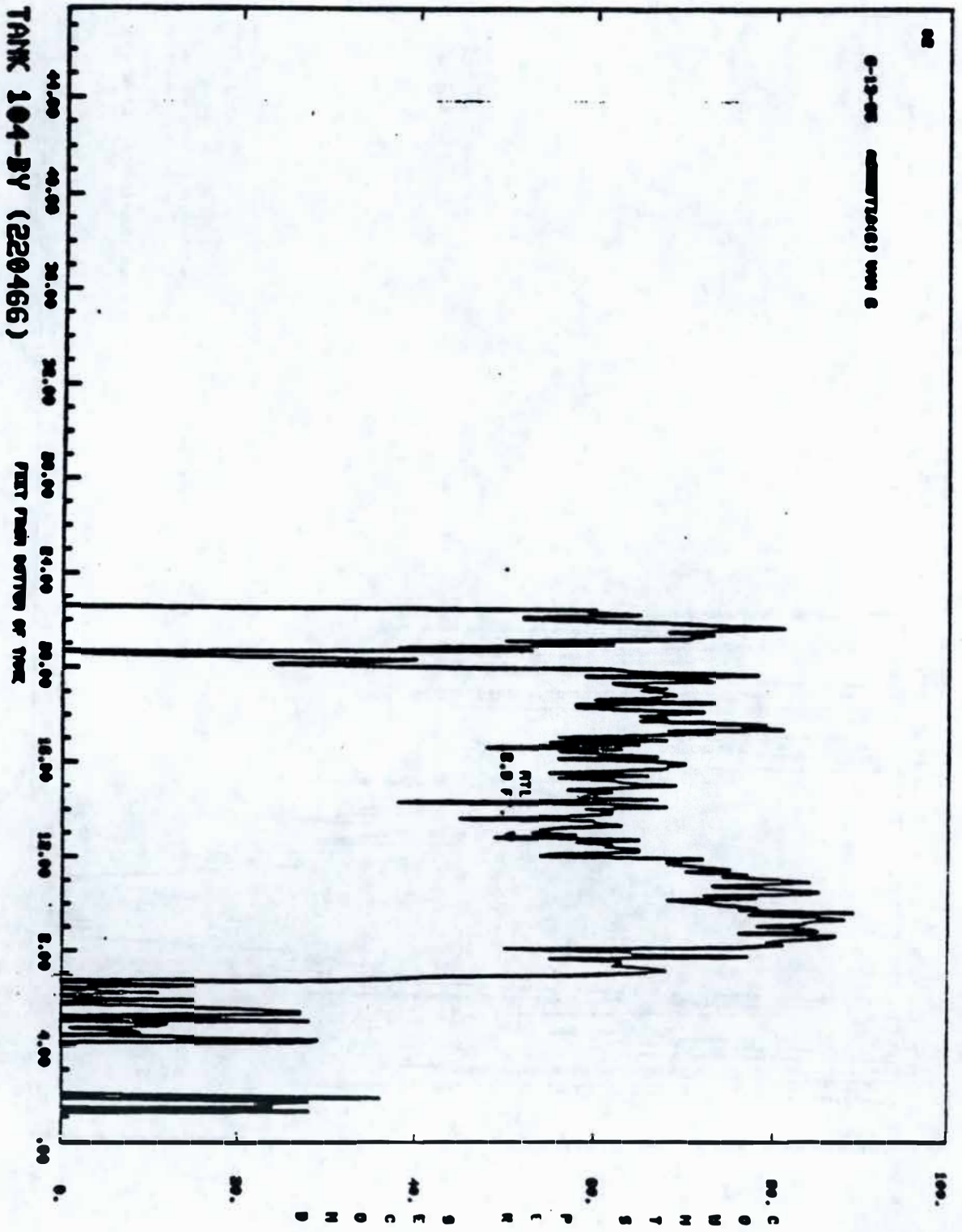

TANK 104-BY (220466)
FEET FROM BOTTOM OF TANK
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
0.00
0.
50.
100.
150.

FIGURE A-3.9

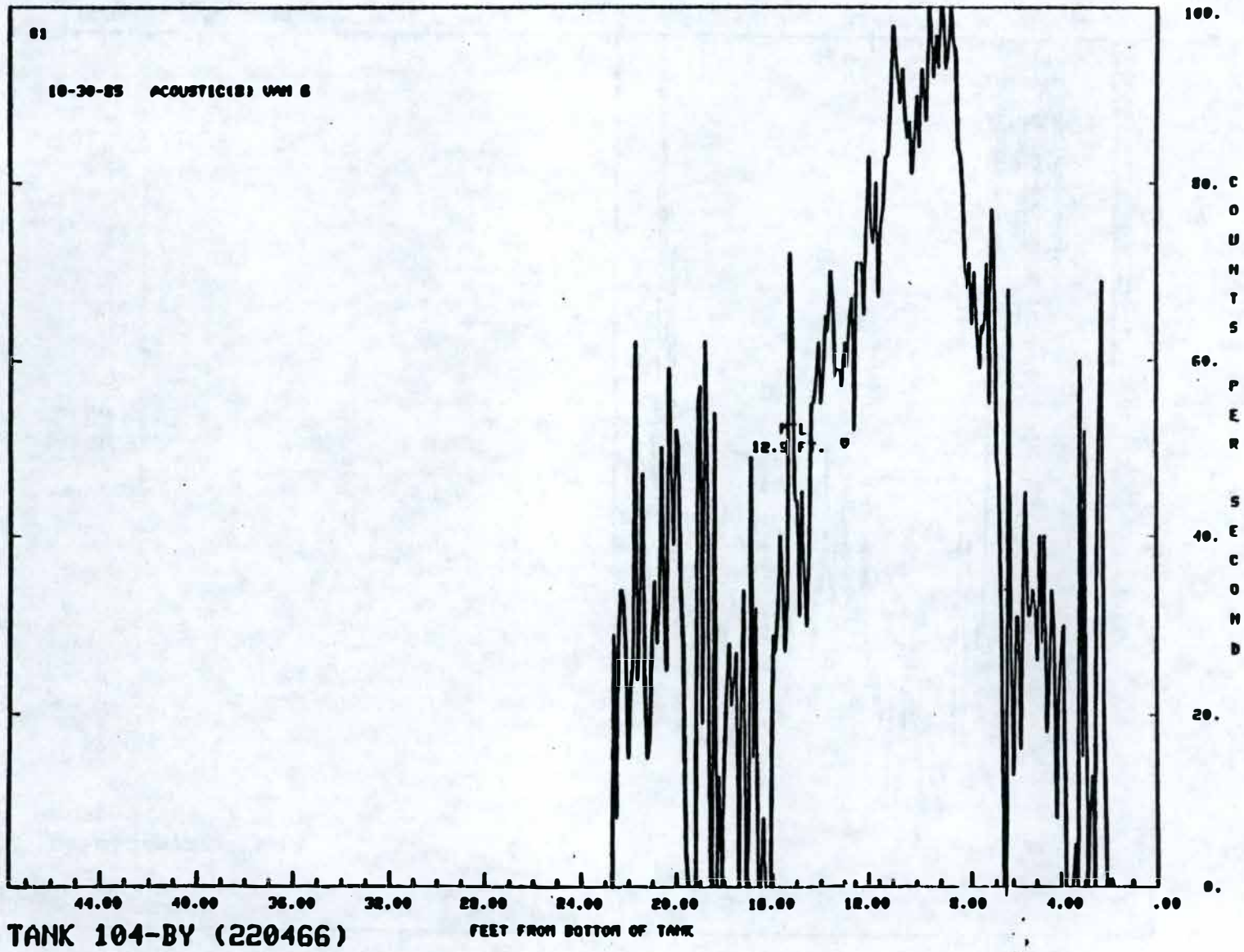

01
10-30-85 ACOUSTIC(B) UNH 6
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 104-BY (220466)

FIGURE A-3.10

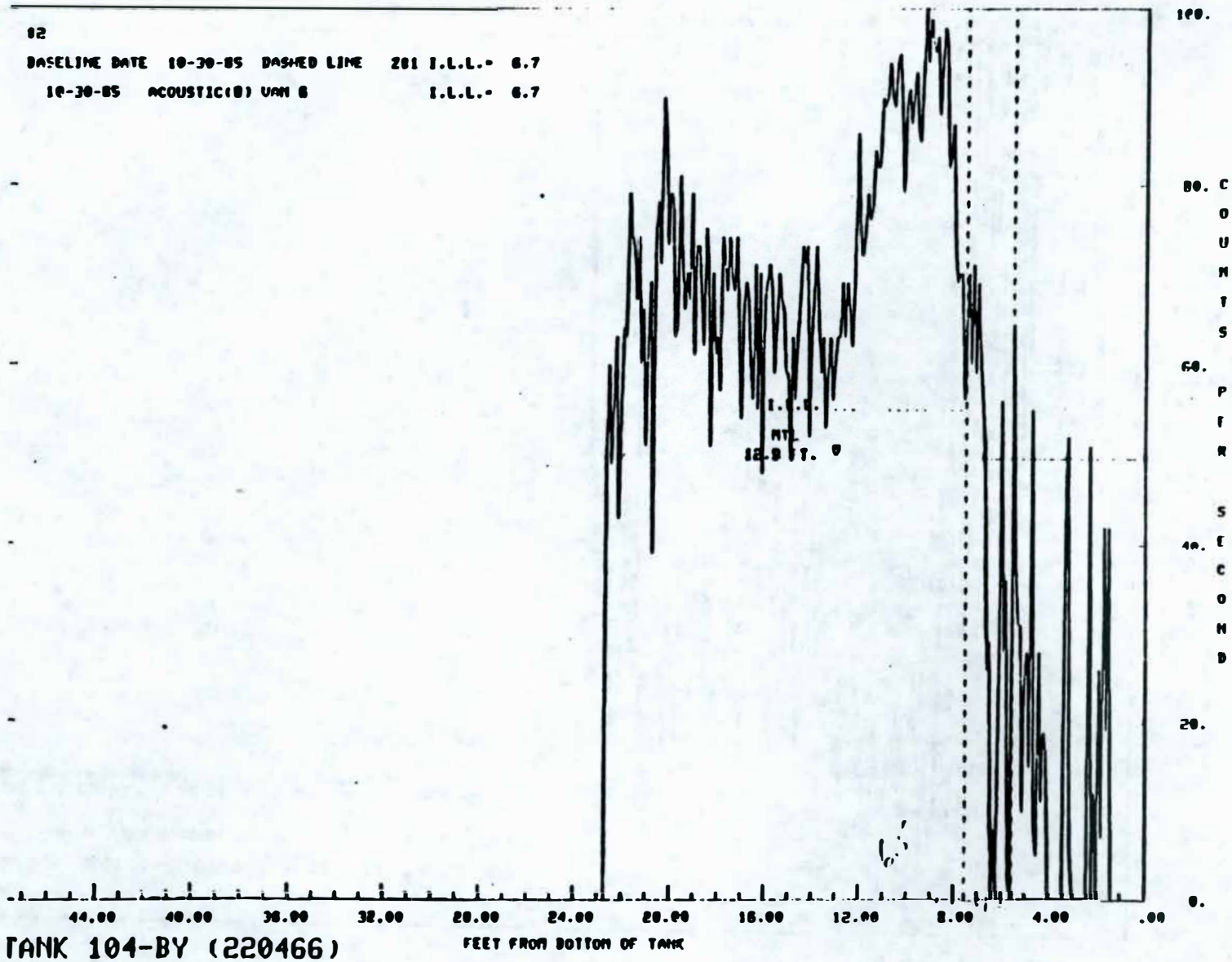

82
BASELINE DATE 10-30-85 DASHED LINE 281 I.L.L.= 6.7
10-30-85 ACOUSTIC(B) VAN 8 I.L.L.= 6.7
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 104-BY (220466)

FIGURE A-3.11

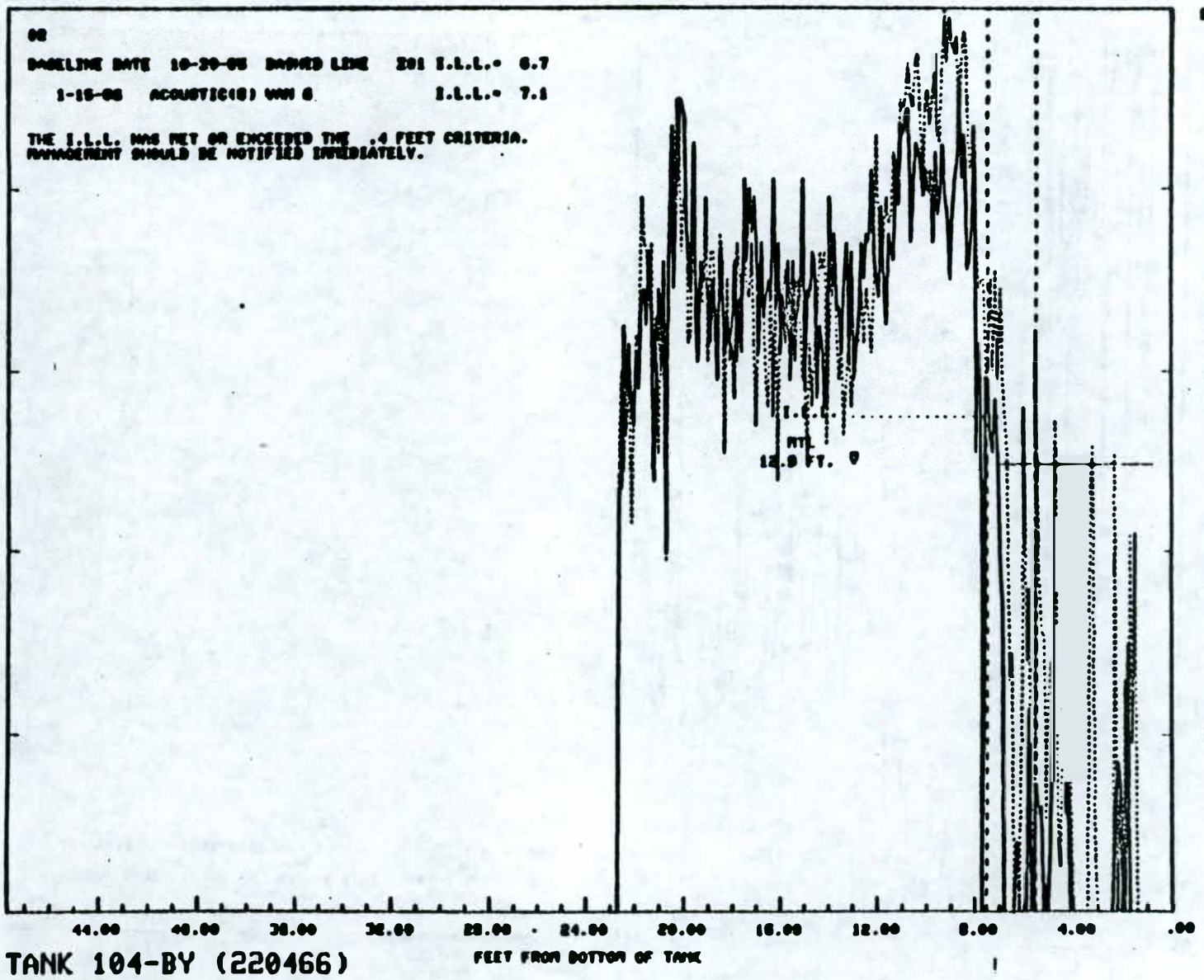


FIGURE A-3.12 (A)

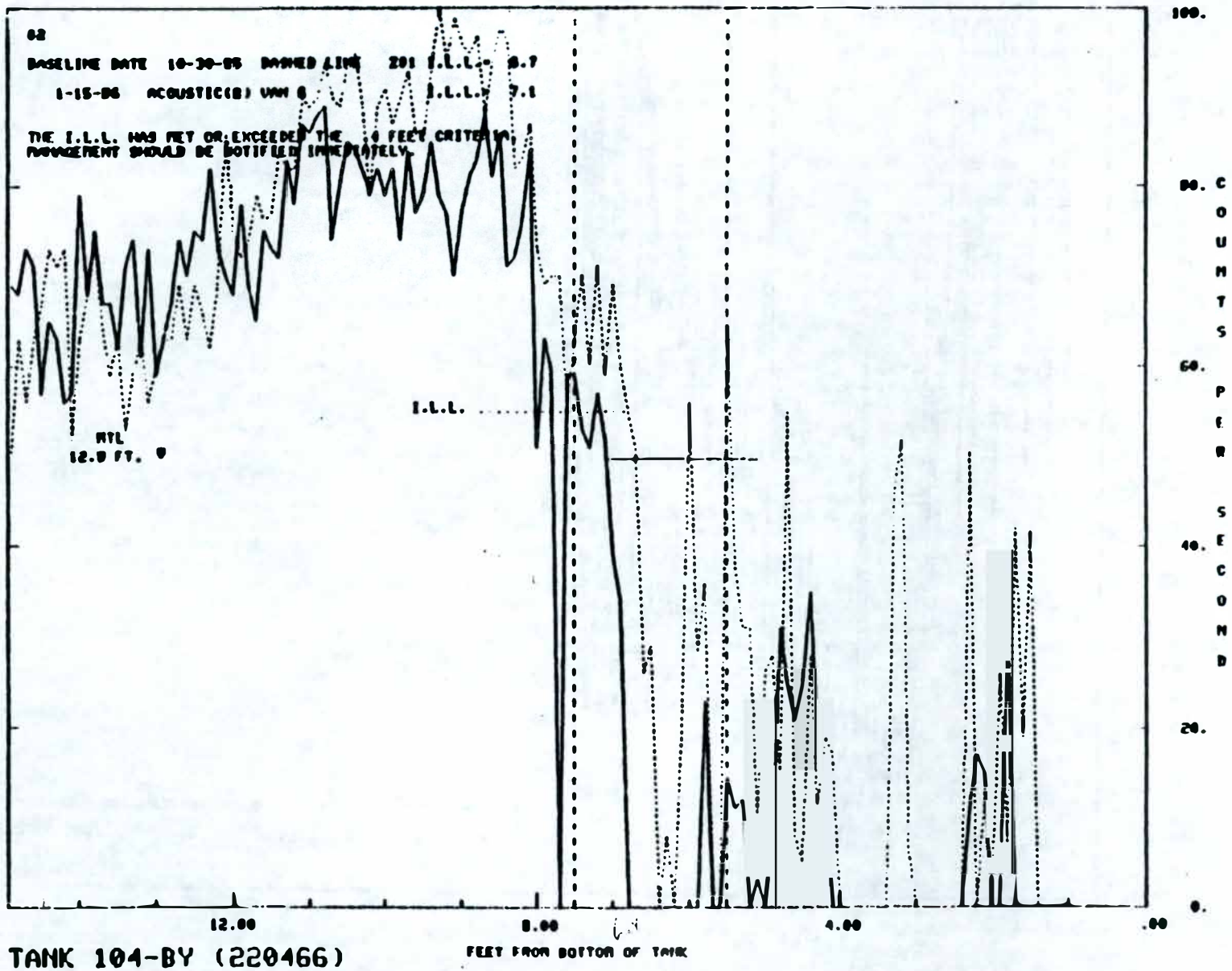


FIGURE A-3.12 (B)

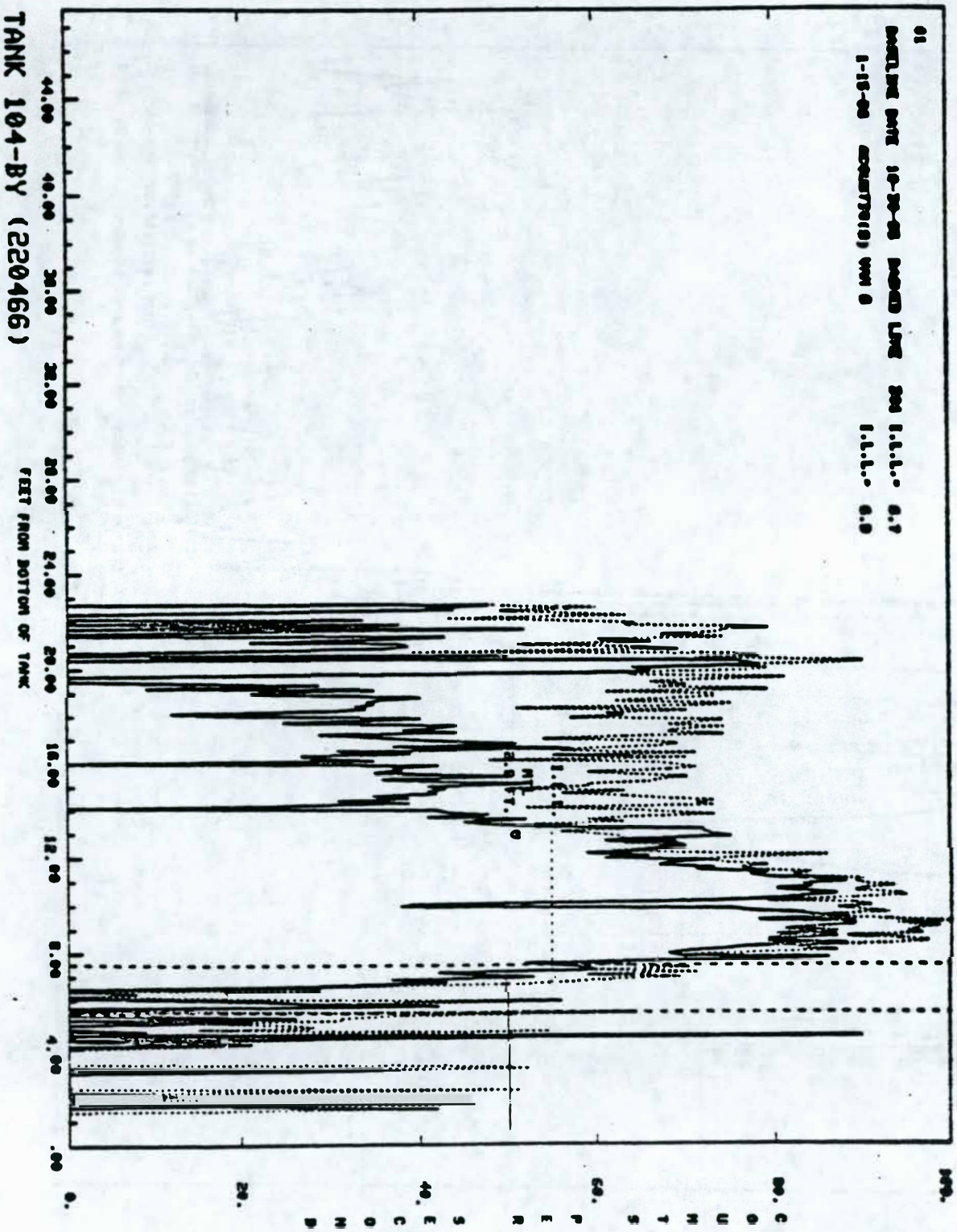


FIGURE A-3.13 (A)

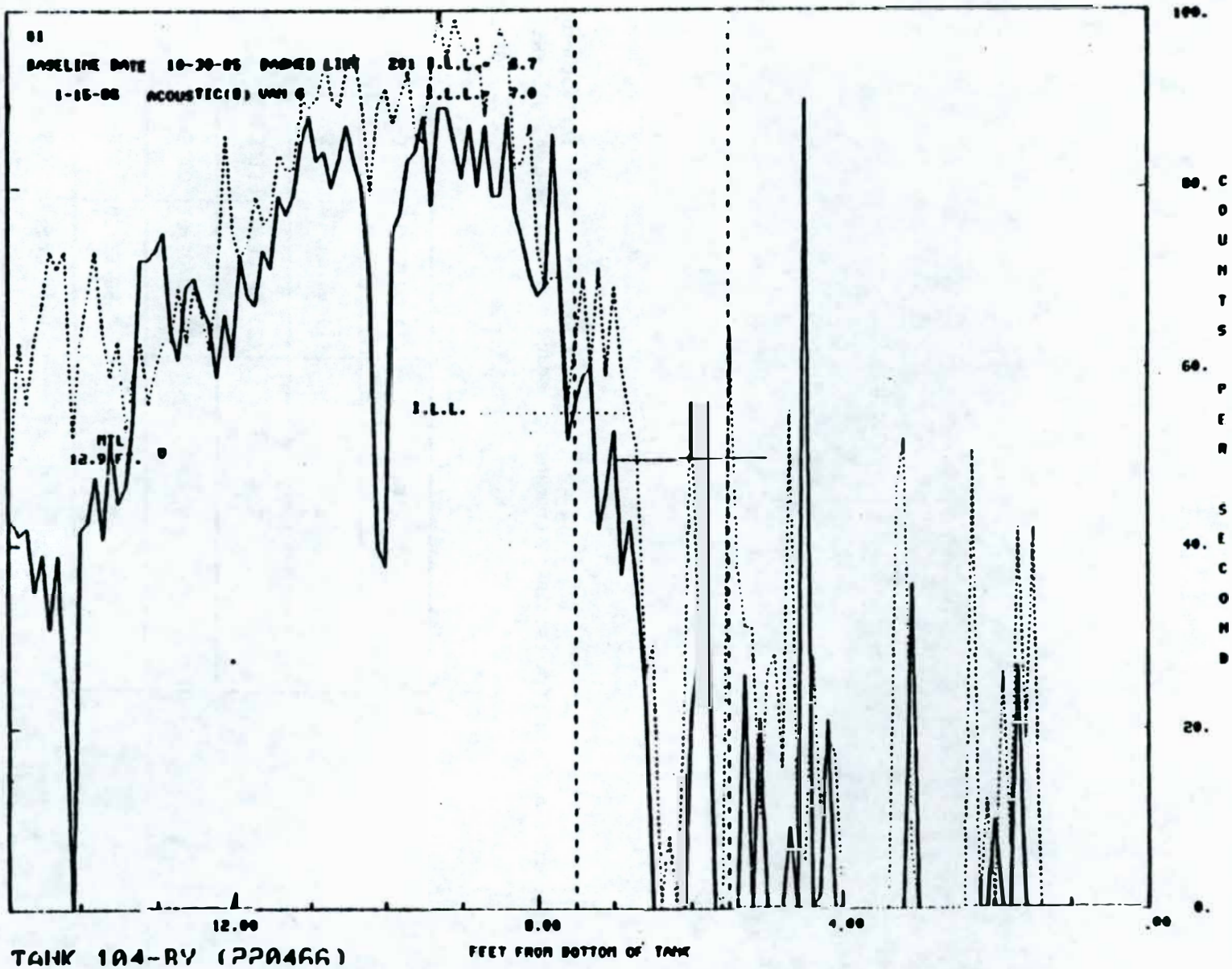


FIGURE A-3.13 (B)

Figure	Scan Date	ILL (Ft)
A-3.9	06/13/85	6.8
A-3.10	10/30/85 (1)	6.5
A-3.11	10/30/85 (2)	6.5
A-3.12	01/15/86 (1)	6.8
A-3.13	01/15/86 (2)	6.5

Discussion:

The ILL values for the three measurement systems will now be presented chronologically:

Figure	Date	ILL (Feet) Probe N	G	A
A-3.1	05/24/85	6.2		
A-3.5	05/31/85		6.3 6.5	
A-3.9	06/13/85			6.8
A-3.2	07/22/85 (1)	6.1		
A-3.6	07/23/85		6.3 6.5	
A-3.2	08/29/85	6.1		
A-3.6	09/26/85		6.4 6.6	
A-3.10	10/30/85 (1)			6.5
A-3.11	10/30/85 (2)			6.5
A-3.7	11/07/85		6.3 6.5	
A-3.4	11/19/85	6.1		
A-3.8	01/07/86		6.2 6.4	
A-3.12	01/15/86			6.8
A-3.13	01/15/86			6.5

It then seems that much of each probe's inconsistency can be explained or has been eliminated.

The neutron scans, in spite of some obviously bad data, are consistent at 6.1 feet. This is only a preliminary ILL. It is not an absolute point of liquid/no liquid. There is a moisture gradient in evidence that is quite wet. Also, there is an end effect which will be discussed in subsequent examples.

The gamma scans are troubled by a reference shift. The assigned ILL can be either 6.3 or 6.5 feet. The data does not suggest a trend. Either value is quite uniform.

The acoustic scan is troubled by a transition zone that is preceded by a semi-wet area (see Figure A-3.10). This may be delaying the transition. That is, the dry acoustic reflection may not occur until higher than normal into the gradient. The acoustic scan ILL variation of 0.3 foot appear to be a result of measurement system shifts, more than anything else. This is particularly true since such a shift was noted on successive scans on January 15, 1986. One can guess (3 to 2) that the probable correct ILL depth is 6.5 feet. Again, no trend is exhibited.

Conclusion:

The tank is a stable Type III example. Unfortunately, the data measurements do not exactly coincide and they exhibit some system positional inconsistencies. The ILL is subject to interpretation, but appears to be at 6.5 feet. The stability of all readings with time provides assurance that good tank integrity exists. Except for the moisture gradient at the ILL, which may drain and settle out, no other dynamic activity appears evident. The remaining examples will treat the end effects which bring the neutron probe into agreement.

EXAMPLE 4: TK-114TX

The Problem:

Provide an overview of the seemingly unusual scans provided by the neutron and gamma probes as contrasted to the simple ILL of the acoustic probe.

NEUTRON PROBE DATA REVIEW

This review certainly illustrates a variety of interesting data. First, refer to Figure A-4.1 and ignore the ILL selection on the plot. It should be at 5.4 feet on the July 26, 1985 baseline and on the April 7, 1986 scan. Thus, an unchanged ILL reporting is probably justified. Note, that at about 7 feet there appears to be major Ostwald Ripening. This is denoted by decreased moisture content, which subsequently increases again above the affected region. The gamma probe should also correspond. As a source for additional data on this, see the appendix in Reference 3 on the water addition tests on TK-109S. It is quite necessary to properly estimate the porosity of the saltcake if level changes are correlated to volume, (to report a leak for example). Tank TK-109S tests represent an important data point for such calculations. The saltcake surface is at about 18 feet.

GAMMA PROBE DATA REVIEW

Figures A-4.2 and A-4.3 illustrate good gamma scan continuity except for modest changes to the January 22, 1986 scan in the region of the ILL. The very large region, of probable Ostwald Ripening, at about 7 feet is clearly evident. The reduced gamma content through the region is typical.

The high and low markers for the ILL are set too wide, somewhat off the transition. Settings of 3,000 and 5,700 cps are recommended. The ILL still does not appear to be calculating correctly. A 4400 cps location is closer to correct. This yields an ILL of 5.1 feet for both scans of Figure A-4.2. Figure A-4.3 has an ILL of 5.0 feet for the baseline and 5.3 for the January 22, 1986 scan.

The saltcake surface reading is quite unusual. It seems to offer shielding effects above the apparent surface at 18 feet. The records of this tank could be researched to check for other additions (non-radioactive).

ACOUSTIC SCAN DATA

Figure A-4.4 provides the acoustic scan with baseline for this tank. The data seems supportive and offers nothing unusual.

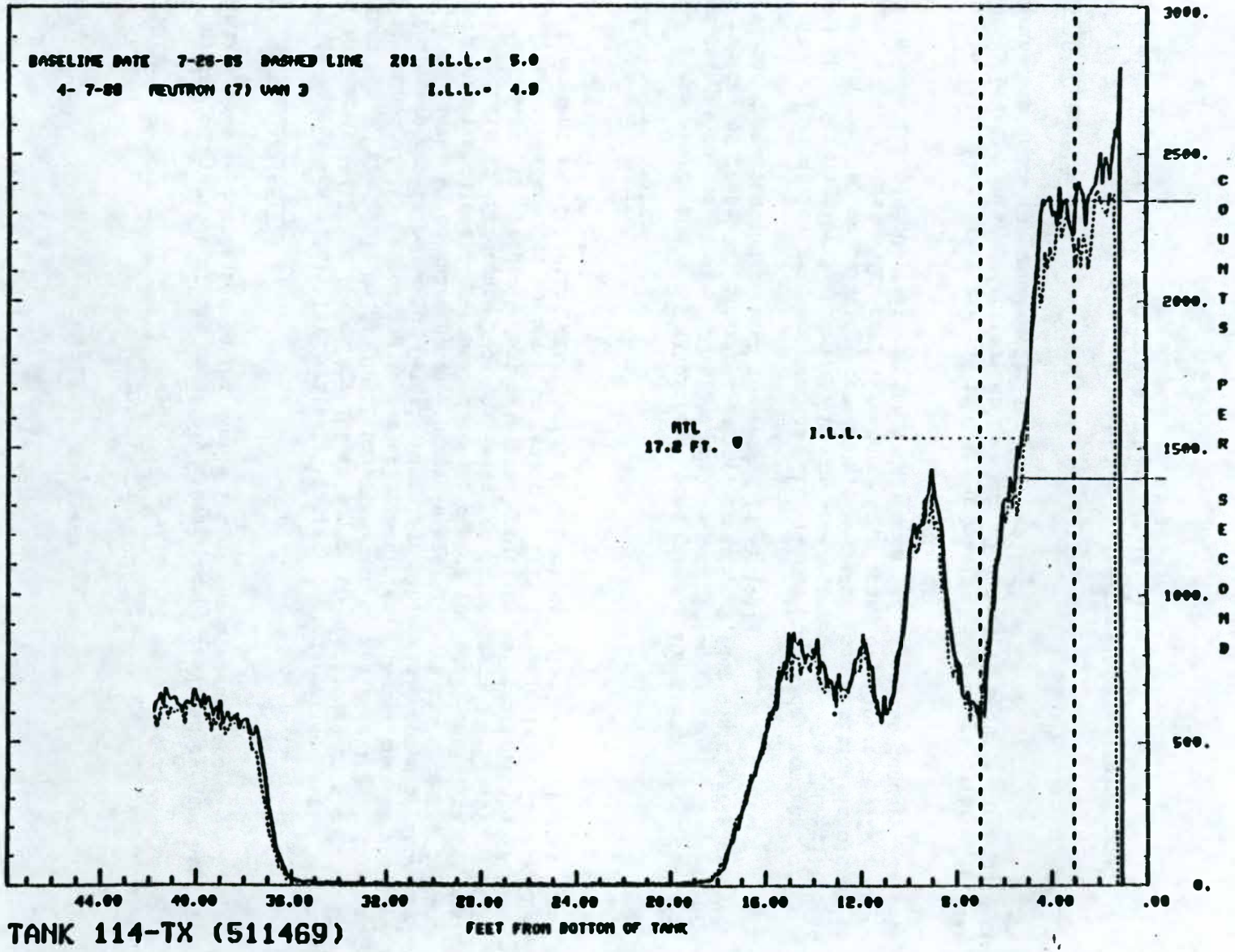

BASELINE DATE 7-28-88 DASHED LINE 201 I.L.L.= 5.0
4- 7-88 NEUTRON (7) VAN 3 I.L.L.= 4.9
NTL
17.8 FT. 0
I.L.L.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 114-TX (511469)
FEET FROM BOTTOM OF TANK

FIGURE A-4.1

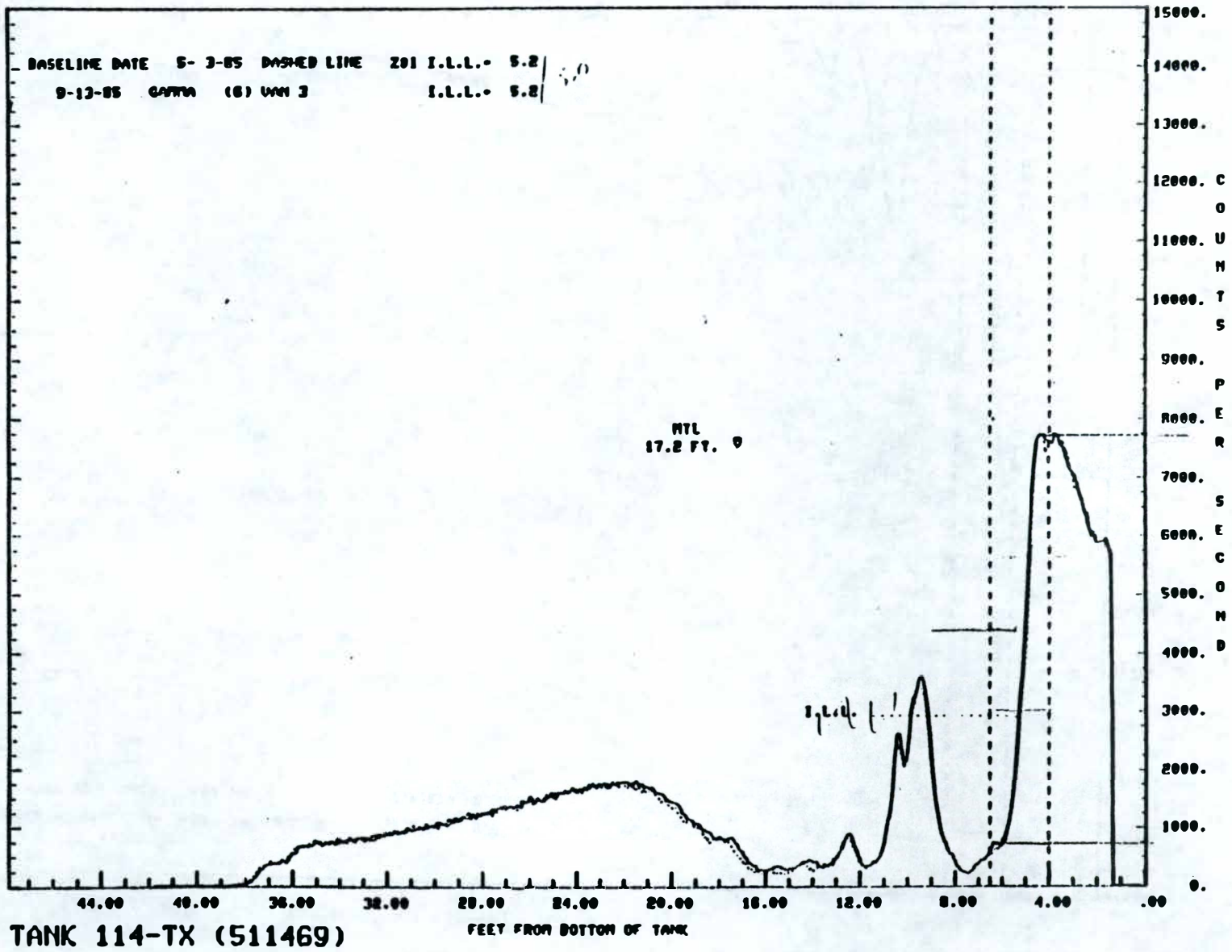

BASELINE DATE 5- 3-85 DASHED LINE 201 I.L.L.= 5.2
9-13-85 GAMMA (6) WM 3 I.L.L.= 5.2
MTL
17.2 FT. 0
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 114-TX (511469)

FIGURE A-4.2

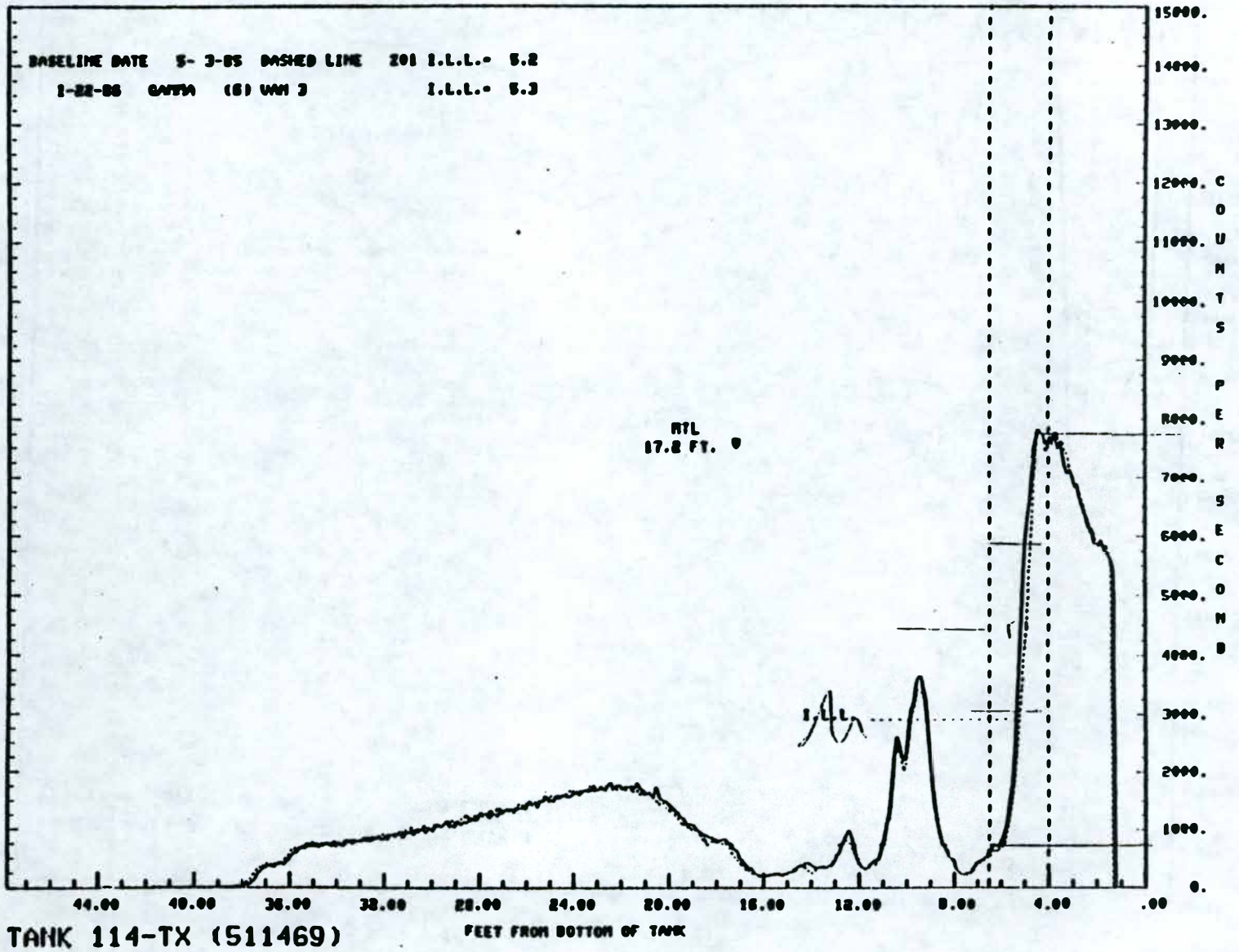
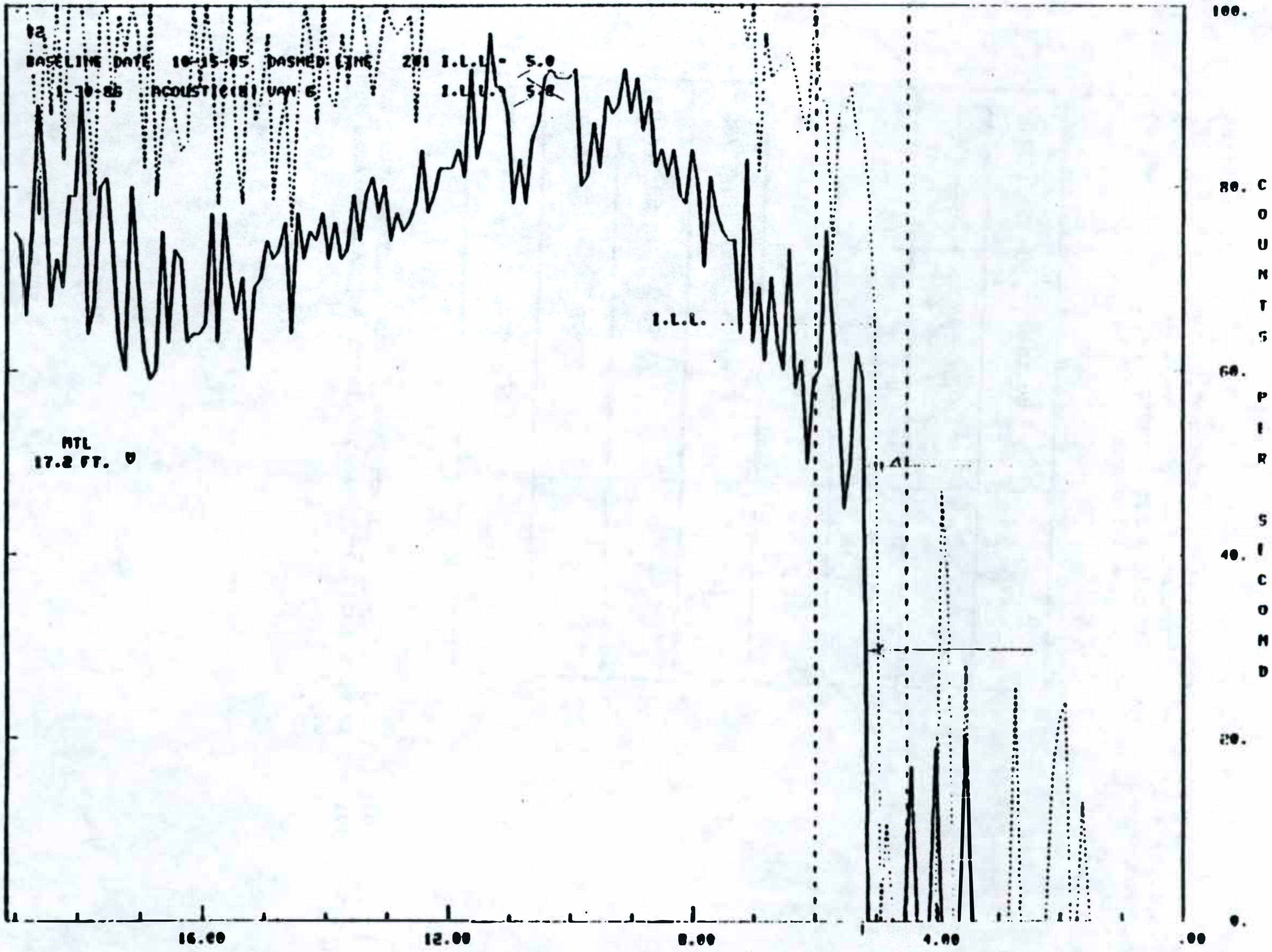

BASELINE DATE 5- 3-85 DASHED LINE 201 I.L.L.= 5.2
1-22-86 GAMMA (6) VAN 3 I.L.L.= 5.3
RTL
17.2 FT. 0
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 114-TX (511469)

FIGURE A-4.3



TANK 114-TX (511469)

FIGURE A-4.4

The ILL determinations must be changed as follows:

1. Set the lower marker to 0%
2. Set the upper marker to 60%
3. The ILL is at: $\frac{0 + 60}{2} = 30\%$
4. The ILL value is 5.3 feet.
5. The baseline is 5.1 feet.

Discussion:

The plot, provided by the acoustic probe, indicates none of the information available from the neutron and gamma scans. The ILL for all probes is as follows:

Scan Date	Probe Type	ILL (Ft)
05/03/85	Gamma	5.1
07/26/85	Neutron	5.4
09/13/85	Gamma	5.1
10/15/85	Acoustic	5.1
01/22/86	Gamma	5.3
01/30/86	Acoustic	5.3
04/07/86	Neutron	5.4

As can be seen, only some of the divergent values of the acoustic ILL suggest the complex nature of this tank if the supporting gamma and neutron probe data is ignored. This data must be included, however, to assess the activities being signaled as each was discussed, e.g., Ostwald Ripening and possible volumetric displacement.

Conclusion:

Complex tank contents of Type III. There may be the remnants or the beginning of some internal activity now in progress. The ILL is set at 5.3 feet, pending continued review.

EXAMPLE 5: TK-103BY

The Problem:

Explain the apparent variance in the interpretation of the ILLs of the probes in the examples.

The data from all three probes is repeating but does not correlate well enough. The neutron probe ILL is shown as 14.5 feet; the gamma probe ILL is shown as 14.9 feet; and, the acoustic probe ILL is shown as 15.3 feet.

Introductory Comment

TK-103BY is quite typical of a tank that has not been salt well pumped. Liquid and saltcake go together to the surface. There may or may not be a crust, but there usually is a moisture gradient at the surface. Activity, with time, can be noted by the gamma scan at various locations below the surface. Since all probes now exit the liquid/salt surface gradient to air, one can expect some different measurements due to surface losses. These effects will be reiterated here. For a more thorough discussion, please refer to the text.

NEUTRON PROBE DATA

Refer to Figure A-5.1 and note that the liquid contents of the tank proceed to the surface. The scans do not appear shifted. The ILL values given in the figure are incorrect and should be changed as follows:

In the same way as the other examples, determine the depth where the slope of the surface line intersects the average liquid count rate of 2,200 cps. This value is 14.3 feet. Now, a correction must be added to account for the premature line slope caused by neutrons escaping from the counting system, near the surface. The value for this correction is presently estimated at 0.8 feet. Therefore, the ILL is 14.3 + 0.8 = 15.1 feet.

Alternately, the ILL can readily be located at the point of sudden transition from the smooth slope to the base at 15.1 feet. Keep this characteristic point in mind, as it is sometimes simpler to identify and use.

GAMMA PROBE DATA

In Figure A-5.2, correct the upper marker from 9,800 cps to 9,200 cps and the lower marker from 6,800 cps to 7,200 cps. The ILL is at about 8,200 cps and has a value of 15.1 feet for the September 25, 1985 scan and 15.0 feet for July 24, 1985 baseline. It is likely that the gamma scan has a 0.05 to 0.1 feet end effect; however, plot accuracies are insufficient for verification. This may also be influenced by surface crusting and the gradient slope.

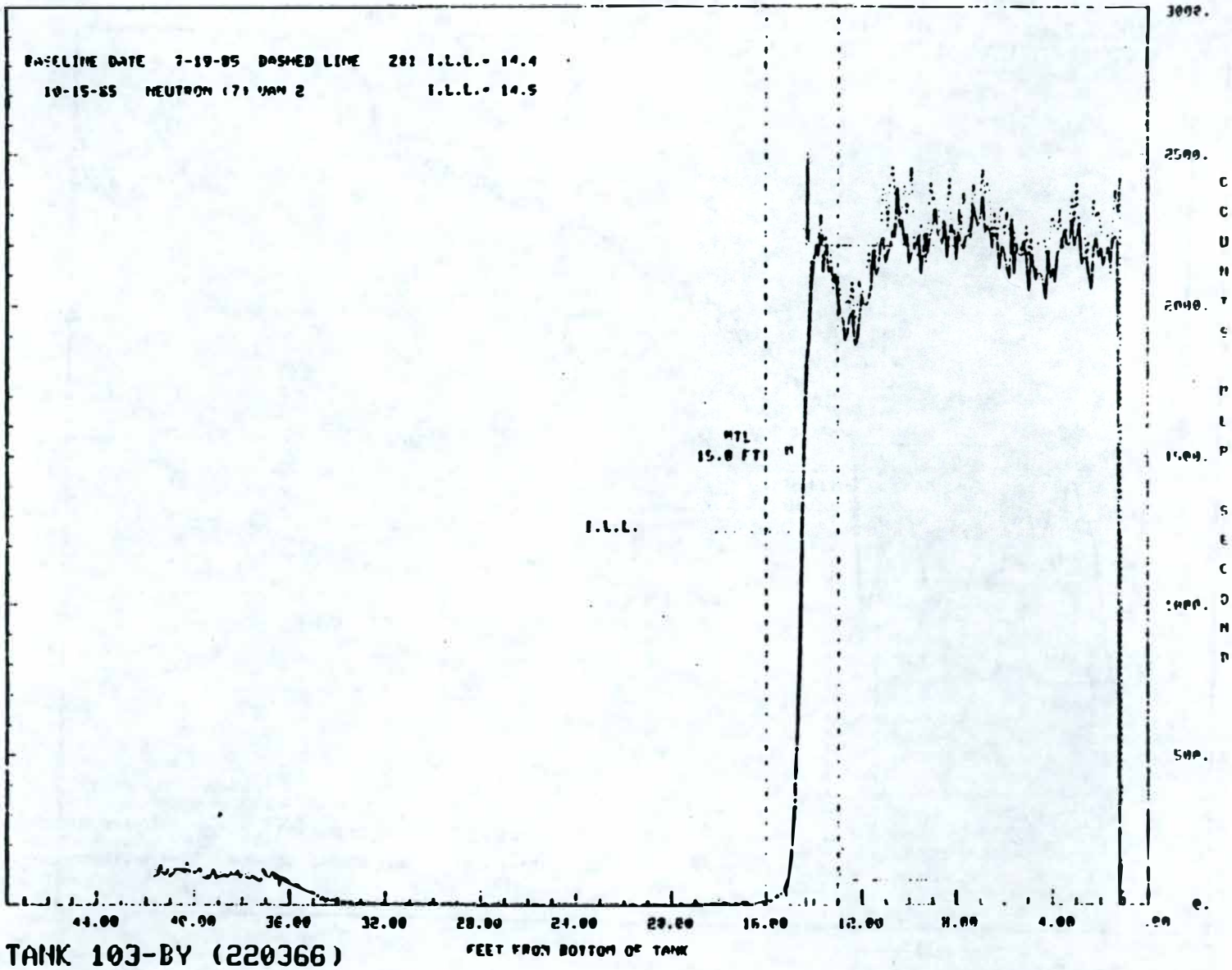
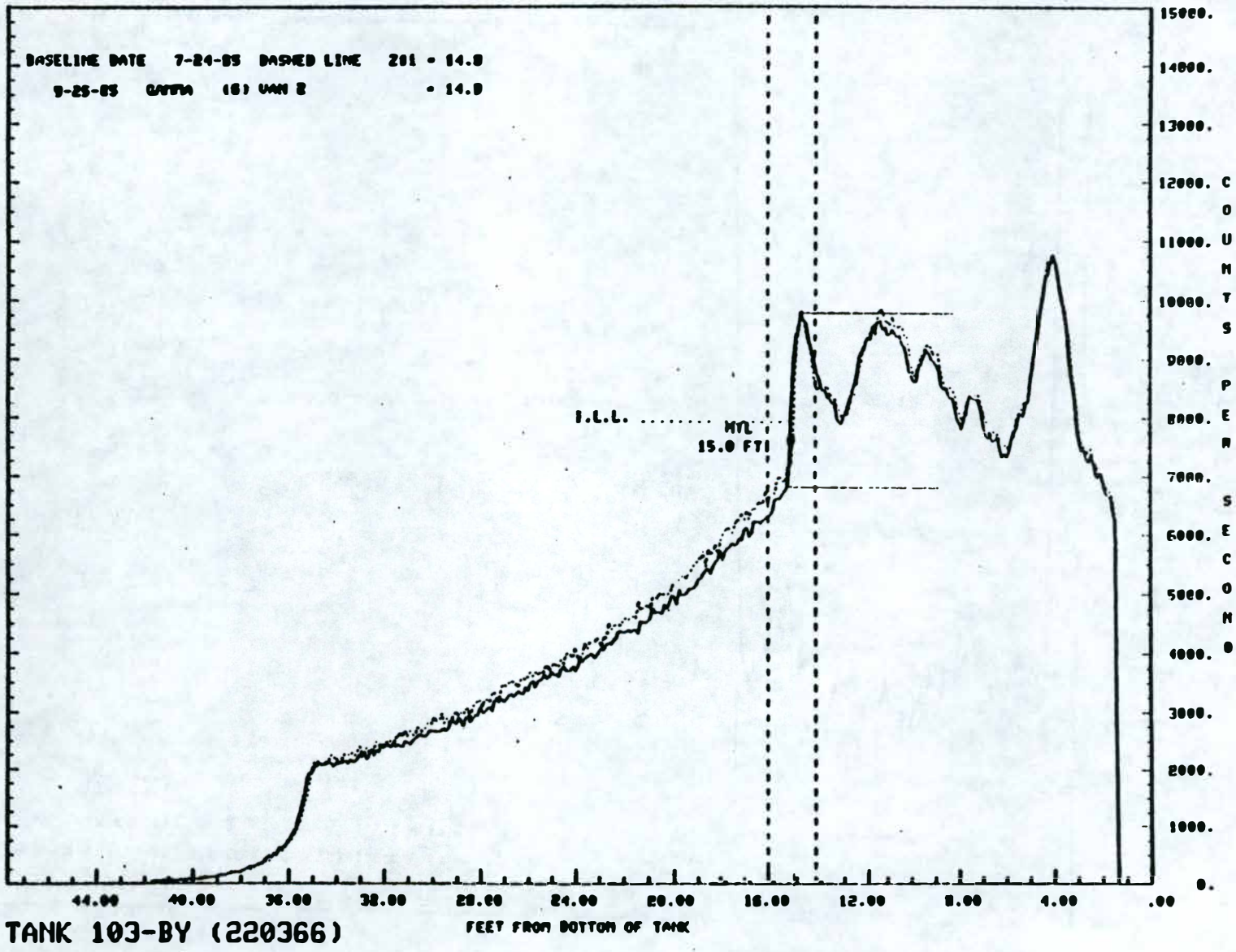

BASELINE DATE 7-19-85 DASHED LINE 281 I.L.L.= 14.4
10-15-85 NEUTRON (7) VAN 2 I.L.L.= 14.5
MTL
15.8 FT
I.L.L.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 103-BY (220366)
FEET FROM BOTTOM OF TANK

FIGURE A-5.1



TANK 103-BY (220366)

FIGURE A-5.2

ACOUSTIC PROBE DATA

Figures A-5.3 A&B and A-5.4 A&B show excellent correlation and repeatability. However, ILL identification is incorrect. Using Figure A-5.3, set the lower marker at 0 and the upper marker at 38%. The ILL is located at:

$$\frac{38 + 0}{2} = 19\%$$

and has the value 15.1 feet. Using the same technique, the ILL of Figure A-5.4 A&B is 15.1 feet. There is no problem with this determination. The present use of only the 50% point for ILL determination is the main source of procedural error here.

Conclusion:

Tank TK-103BY is a Type I tank that has not been salt well pumped. Recognizing the surface or end effect of the neutron probe allows correlation to the acoustic probe. This is important for diagnostic purposes on tanks of this class whose acoustic ILL determination must deal with a prominent gradient. In this case, TK-103BY, all probes confirm an ILL of 15.1 feet within the measurement accuracy.

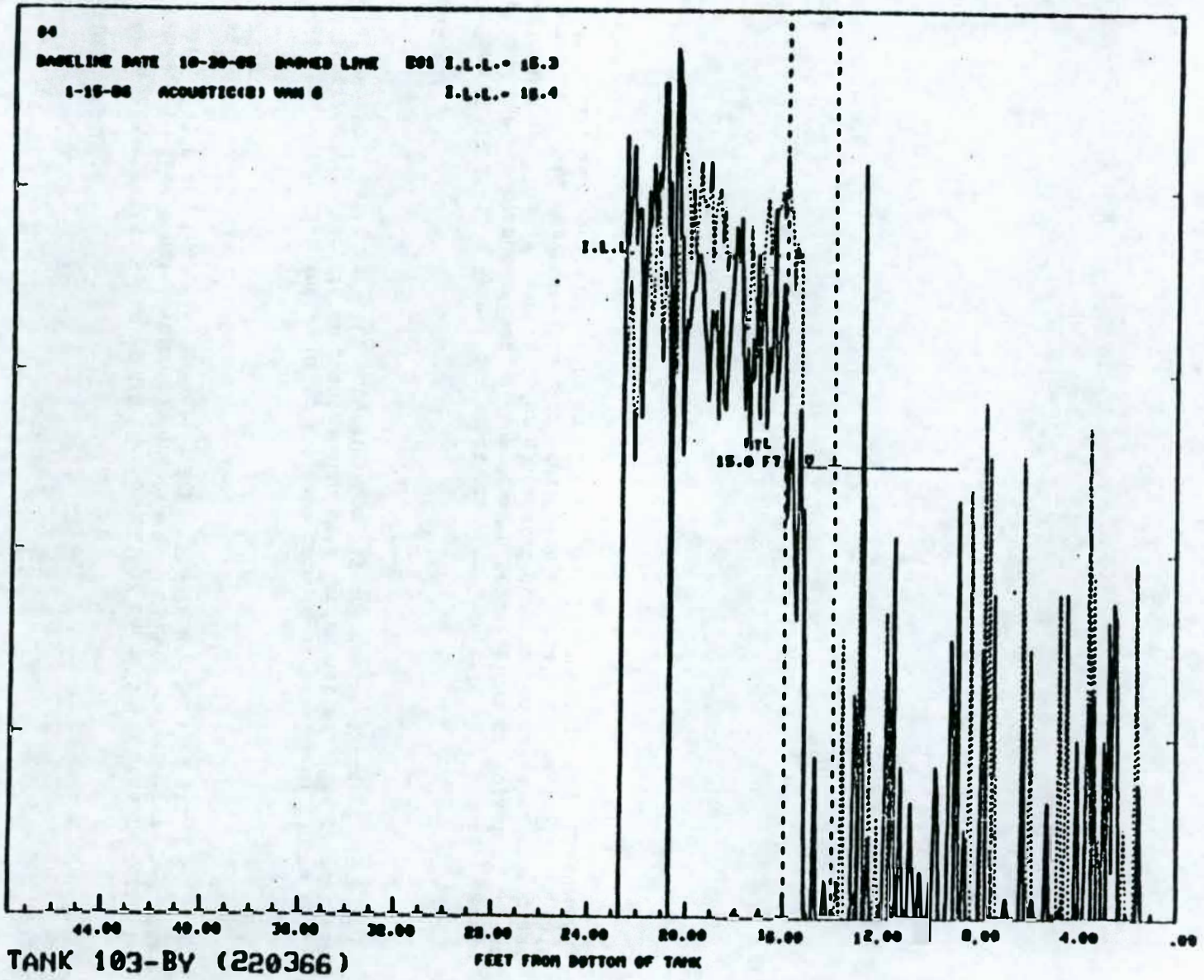

84
BASELINE DATE 10-20-95 DASHED LINE 201 I.L.L.= 15.3
1-16-96 ACOUSTIC(B) WAN 6 I.L.L.= 15.4
I.L.L.
ITL
15.0 FT
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 103-BY (220366)
FEET FROM BOTTOM OF TANK

FIGURE A-5.3 (A)

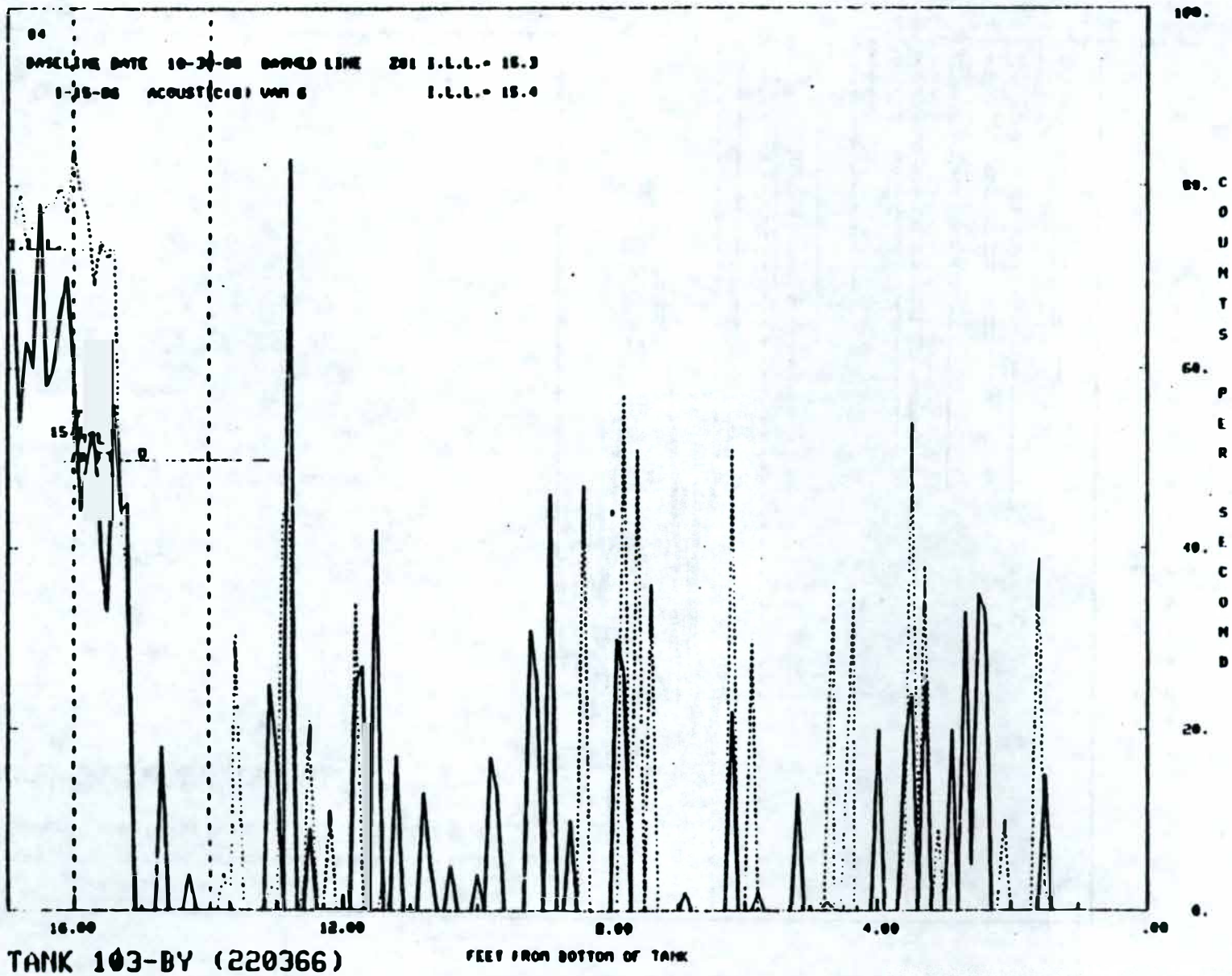

84
BASELINE DATE 10-30-86 BASELINE 201 I.L.L.= 15.3
1-15-86 ACOUST(C:\8) VAR 6 I.L.L.= 15.4
I.L.L.
15.4
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
16.00
12.00
8.00
4.00
.00
TANK 103-BY (220366)
FEET FROM BOTTOM OF TANK

FIGURE A-5.3 (B)

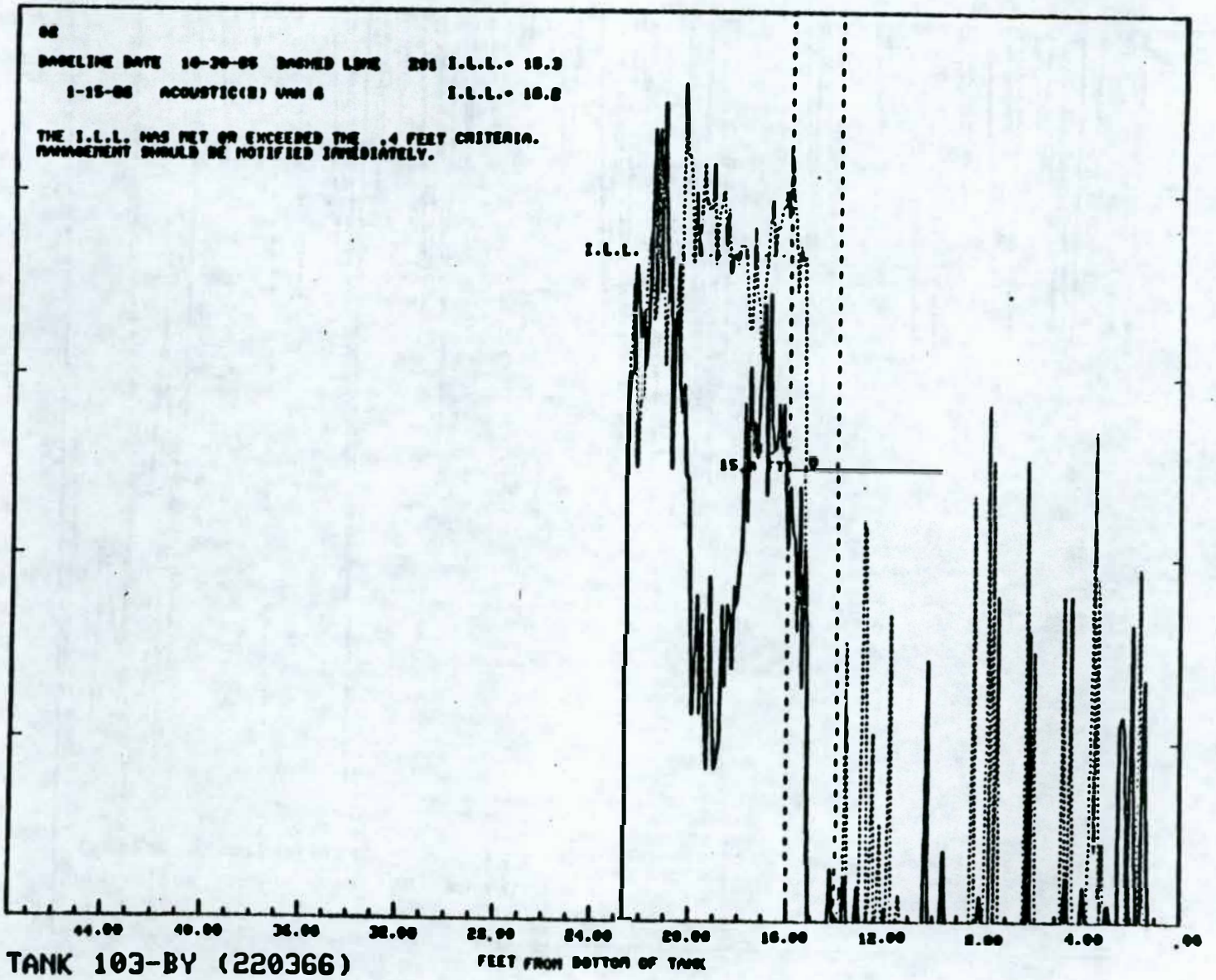

BASELINE DATE 10-20-95 DASHED LINE 291 I.L.L.= 15.3
1-15-96 ACOUSTIC(B) VAN 6 I.L.L.= 15.8
THE I.L.L. HAS MET OR EXCEEDED THE .4 FEET CRITERIA.
MANAGEMENT SHOULD BE NOTIFIED IMMEDIATELY.
I.L.L.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 103-BY (220366)
FEET FROM BOTTOM OF TANK

FIGURE A-5.4 (A)

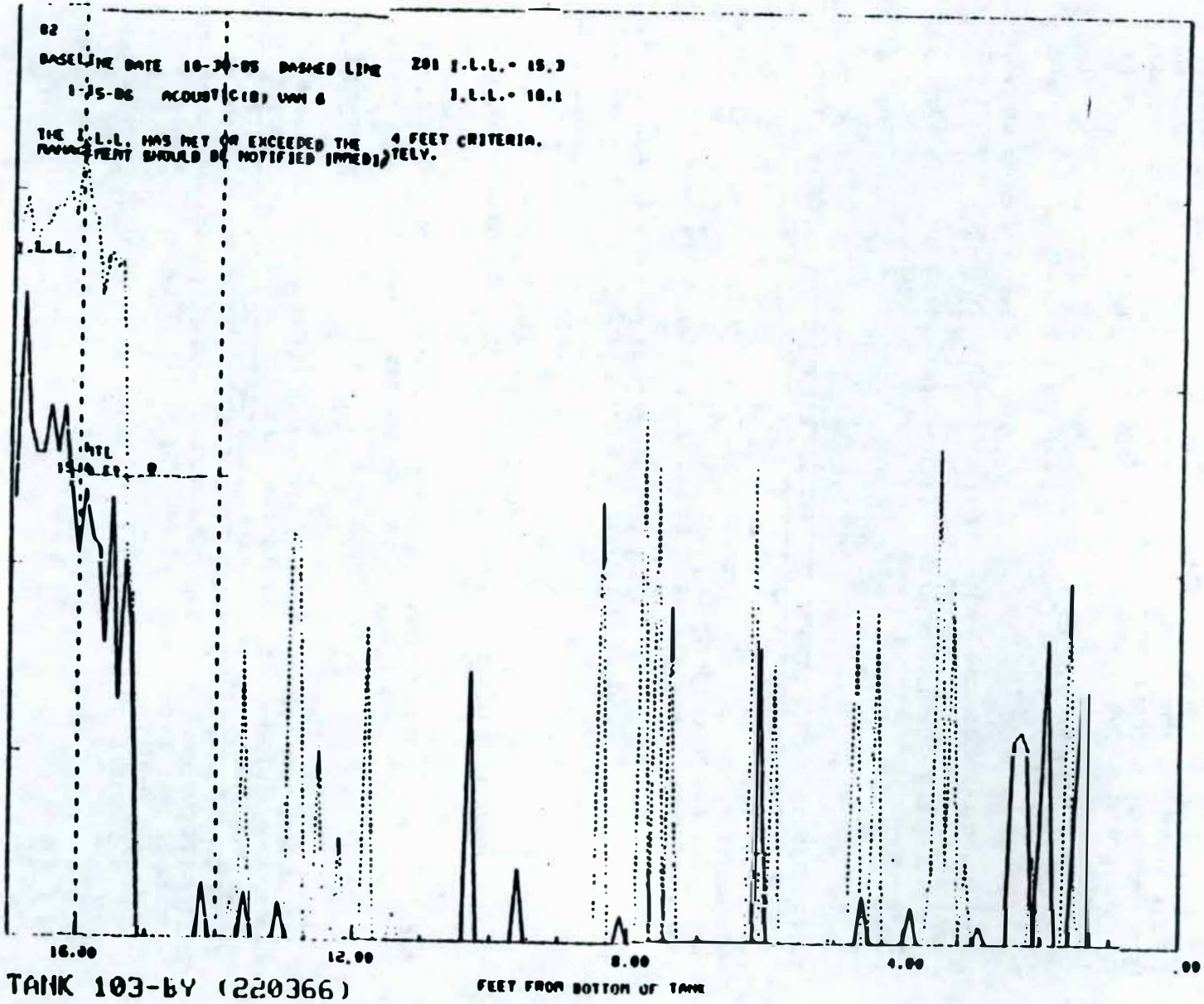

82
BASELINE DATE 10-30-95 DASHED LINE 201 I.L.L.= 15.3
1-25-96 ACOUSTIC(B) VAN 8 I.L.L.= 18.1
THE I.L.L. HAS MET OR EXCEEDED THE 4 FEET CRITERIA.
MANAGEMENT SHOULD BE NOTIFIED IMMEDIATELY.
I.L.L.
INTL
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
16.00
12.00
8.00
4.00
.00
TANK 103-BY (220366)
FEET FROM BOTTOM OF TANK

FIGURE A-5.4 (B)

EXAMPLE 6: TK-101S

The Problem:

Determine if the selected acoustic ILL of 13.6 feet is correct.

Like Example 5, the ILL values assigned to each probe do not adequately correlate: the neutron, 12.9 feet; the gamma, 13.3 feet; and the acoustic, 13.5 feet. In addition, the acoustic scan shows a transition from full wet at 9.5 feet to a partial wetness for 4 feet, until the assigned ILL is reached. Why is the ILL placed at greater dryness (percent amplitude) in this example and placed in exactly the opposite way in Example 1, whose acoustic scan is similar?

NEUTRON PROBE DATA

Figure A-6.1 is a current neutron probe scan of this tank. Using the exact same technique(s) as were illustrated in Example 5, (again, this is a non-pumped tank), determine the ILL.

By either method, the ILL value is 13.5 feet. Disregard the incorrect ILL of 12.9 feet or 13.2 feet, shown on the scan.

GAMMA PROBE DATA

The gamma scans of Figure A-6.2 are virtually overlays. However, the ILL has been incorrectly assessed as 13.3 and 13.4 feet.

Move the upper marker from 11,200 cps to 10,500 cps. Move the lower marker from 6,800 cps to 7,200 cps. The ILL is located at about 9,000 cps and has the value of 13.5 feet. Note, that the computer selected ILL is at the same location, but the value is shown as 13.3 or 13.4 feet. Many such errors have been noted. It follows then, that this value (for all probes) must be verified manually. The computer determination of the ILL does not always appear to work correctly.

ACOUSTIC PROBE DATA

Figures A-6.3 A&B are a representative acoustic scan of this tank. It is also very similar to Figure A-1.1, an acoustic scan of TK-110BY. On the latter scan, the ILL was determined to be at 6.3 feet with a secondary inflection point (explained in Example 1 text), of 8.9 feet.

Referring to Figures A-6.3 A&B for this tank, is the ILL to be selected at 9.6 feet, 10.7 feet, 12.0 feet, or perhaps at 13.5 feet (as is indicated)?

Based on the methodology developed so far, the gamma and neutron probe data will provide the answer; and, without correlating those results, one could only guess at what depth to assign. As we shall see in this case, the ILL is at 13.5 feet, in total contrast with Figure A-1.1 of TK-110BY, whose ILL is 6.3 feet.

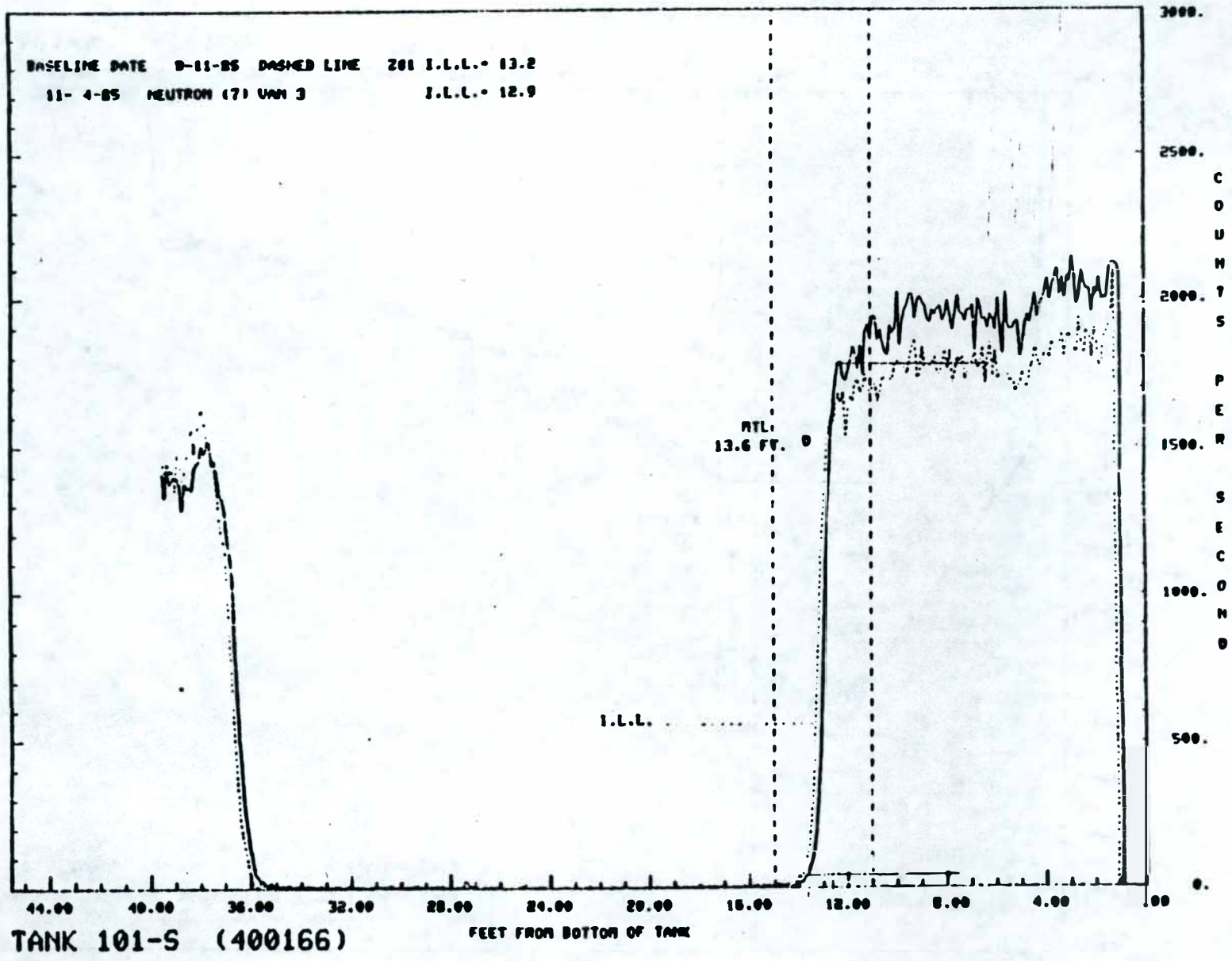

BASELINE DATE 9-11-85 DASHED LINE 201 I.L.L.= 13.2
11- 4-85 NEUTRON (7) VAN 3 I.L.L.= 12.9
RTL
13.6 FT. D
I.L.L.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 101-S (400166)

FIGURE A-6.1

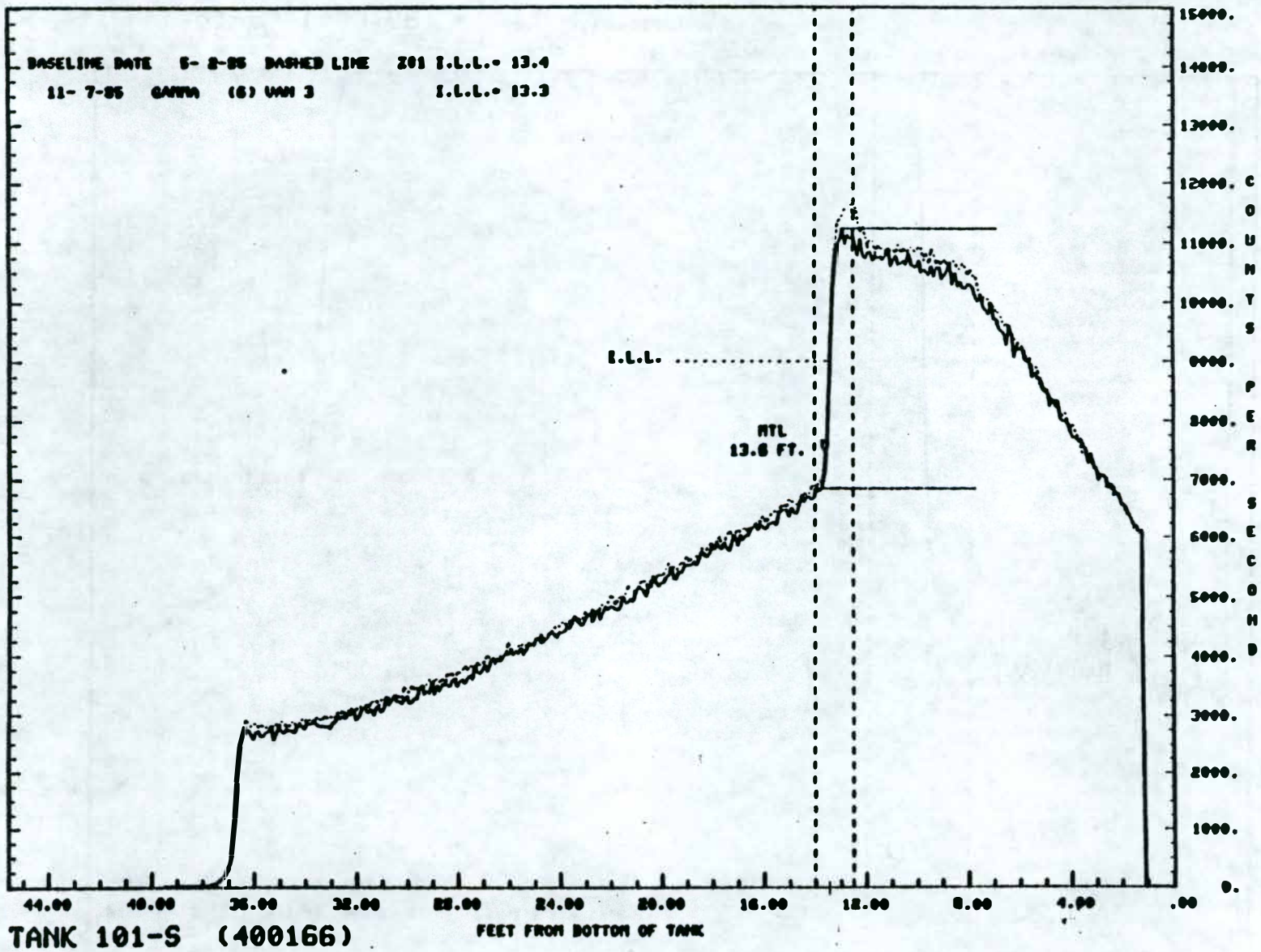

BASELINE DATE 5- 2-95 DASHED LINE 201 I.L.L.= 13.4
11- 7-95 GAMMA (6) VAN 3 I.L.L.= 13.3
I.L.L.
MTL
13.6 FT.
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 101-S (400166)
FEET FROM BOTTOM OF TANK

FIGURE A-6.2

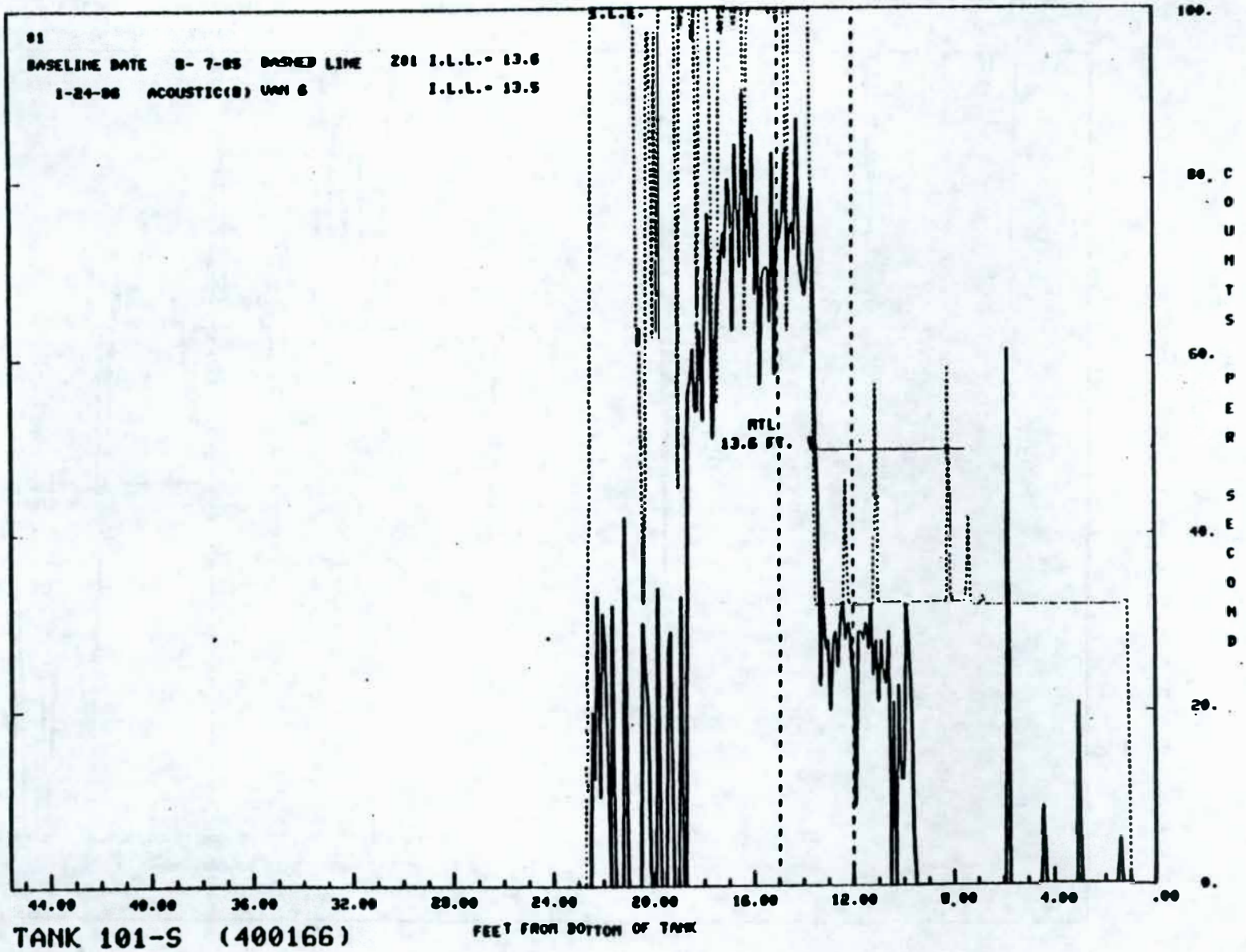

01
BASELINE DATE 8- 7-85 BASELINE LINE 201 I.L.L.= 13.6
1-24-86 ACOUSTIC(B) VAN 6 I.L.L.= 13.5
I.L.L.
RTL
13.6 FT.
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 101-S (400166)
FEET FROM BOTTOM OF TANK

FIGURE A-6.3 (A)

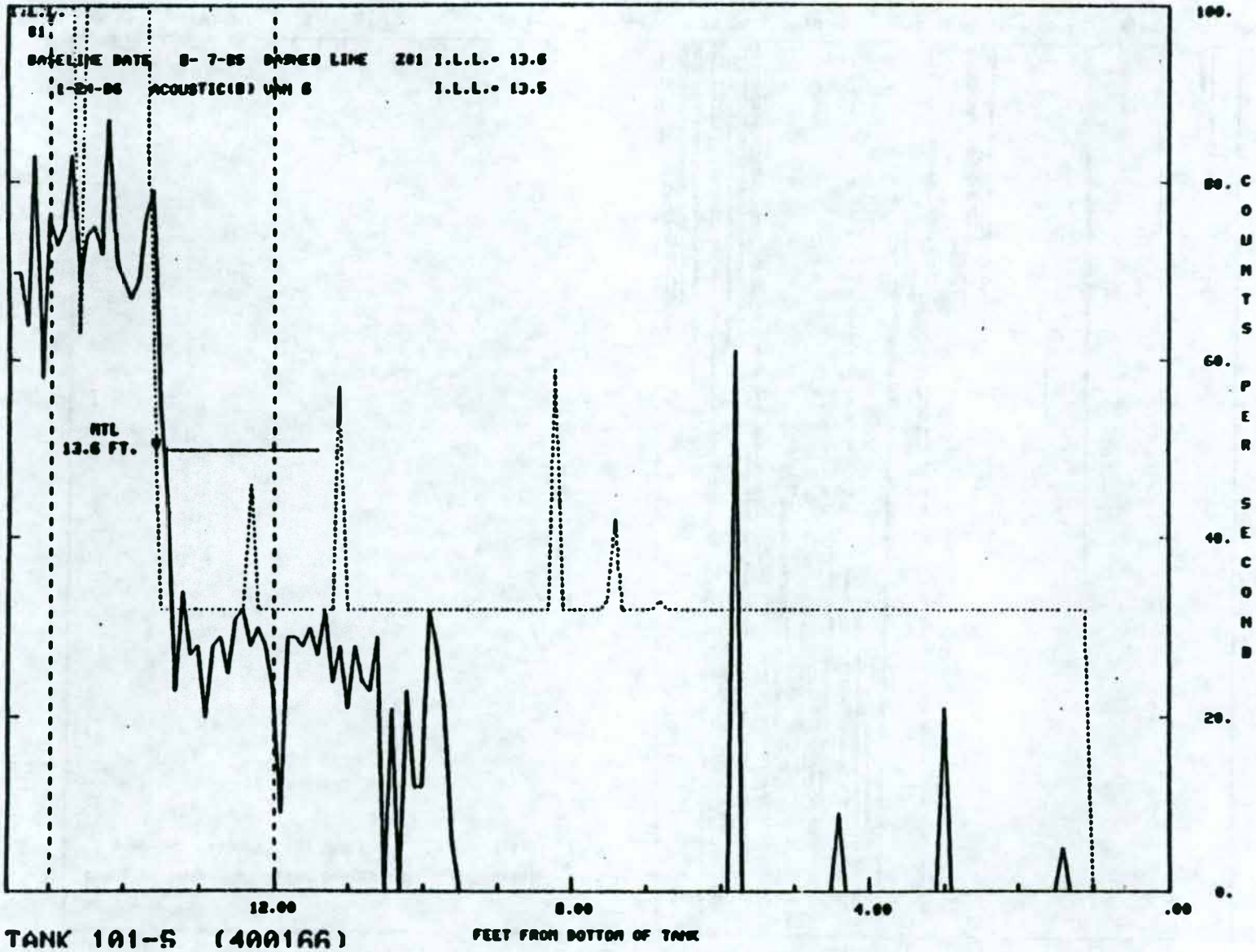

I.L.L.-
81
BASELINE DATE 8- 7-95 MARKED LINE 201 I.L.L.- 13.6
1-24-96 ACOUSTIC(B) UNH 6 I.L.L.- 13.5
NTL
13.6 FT.
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
12.00
8.00
4.00
.00
TANK 101-S (400166)
FEET FROM BOTTOM OF TANK

FIGURE A-6.3 (B)

Discussion:

The apparent dichotomy presented by the acoustic scan data of Figure 1 (TK-110BY) and this example, is readily explainable.

TK-110BY is a tank that has been salt well pumped some time ago. Its internal drainage to form a stable ILL below the now drying saltcake surface is nearly complete. The engineering data for TK-110BY (see Appendix B) states that pumping was started May 1983 and completed December 1984. It goes on to give a value of 9,000 gallons of drainable interstitial liquid (which can be considered for the moment). At 2,750 gallons per inch and 20 to 40% assumed porosity, the 6.3 feet ILL should contain from 42,000 to 83,000 gallons, not counting heel errors. This would seem to indicate that the engineering assigned value of 9,000 gallons is in error, or only about 10% to 20% of the interstitial liquid is drainable. This doesn't appear supported by the data available from these in-tank gamma and neutron probe measurements. In any event, TK-110BY has an ILL that is quite low by virtue of being pumped. This was attested to clearly by the neutron and gamma probe data, the use of which, properly identified the true ILL for this tank at its stage of aging.

Quite on the contrary, but with a very similar acoustic scan, is TK-101S of this example. It has not been salt well pumped. It appears quiescent with only modest amounts of settling. No major region of Ostwald Ripening is discernable; and, the surface of the interstitial liquid and the saltcake are coincident at 13.5 feet.

Conclusion:

TK-101S is a Type I tank with an ILL at 13.5 feet. The assigned value of 13.6 feet is within the measurement accuracy of the results from this example. It is, therefore, now known that the suggested ILL is correct and supported by other data. This finding is not in conflict with other assessments. Finally, the tank appears quiescent with no discernable activity.

EXAMPLE 7: TK-101A

The Problem:

Explain the unusual gamma scan and the lack of correlation of the assigned ILLs.

The assigned ILLs are: Neutron, 29.9 feet; Gamma, 30.6 feet; and Acoustic, 29.3 feet. Additionally, the gamma scan appears strange. This tank is one of the 1,000,000 gallon types and it is nearly full. What effects can be explained in this example?

NEUTRON PROBE DATA

At a casual look, there appears to be nothing unusual about this neutron scan (see Figure A-7.1), except for a slight change in amplitude with respect to the baseline, the scan is an overlay. One can, as usual, disregard the assigned ILL, since the method that was used yields incorrect results. Unfortunately, if one, by rote, used the techniques so far described in this document, the wrong answer for the ILL would still be obtained. Recognizing this to be an unpumped profile, the ILL and the saltcake surface might be assumed the same. The ILL would then be assigned by the techniques of Example 5. In this case, the assumption that the liquid phase goes to the surface is incorrect. There is a cake on top of this one. Therefore, it should be measured in the usual way (Example 1). The tip-off is that the method used in Example 5, fails the test that was given:

The measurement of the depth at the slope intercept of the average liquid count (29.3 feet, here) plus 0.8 feet compensation for end effects, should equal the surface reading (about 30.8 to 31.0 feet, here).

Obviously, it does not (30.9 - 29.3 + 0.8). The difference of about 1.5 feet is surface dry crust. Therefore, the ILL, by this technique, is at 29.3 feet and the saltcake surface is at about 30.9 feet.

GAMMA PROBE DATA

Refer to Figure A-7.2. The initial look at this scan, since it is quite unlike any other presented so far, must be completely unnerving. What is it and how is it useful? Unfortunately, the answer is that the scan isn't as useful as it might be, but it is helpful when understood.

Actually, this gamma scan is quite like that of Figure A-5.2, the gamma scan of Example 5. The principal differences are the depth of the tank contents; much more surface crusting; and mainly, the gamma probe is encountering more gamma intensity that it was designed to accommodate with reasonable linearity. As a consequence, any portion of the scan with a count rate greater than about 11,000 cps is grossly nonlinear and compacted. Note, that the scan is count limited to about 14,000 cps. Also, it should be recognized, that the recorded count rate and the scan profile will actually decrease with increasing gamma

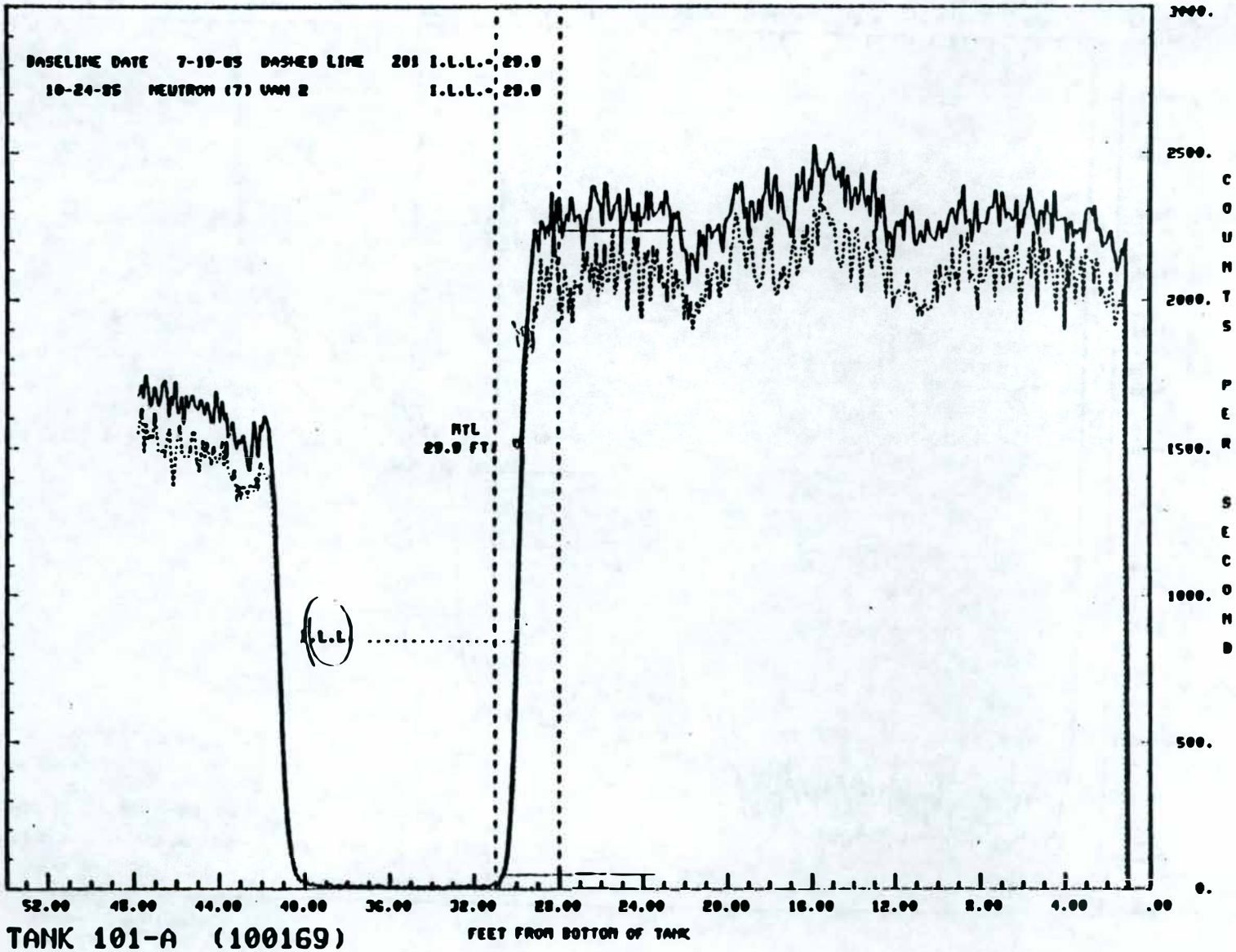

BASELINE DATE 7-19-85 DASHED LINE 201 I.L.L.= 29.9
10-24-85 NEUTRON (7) VAN 2 I.L.L.= 29.9
MTL
29.9 FT
I.L.L
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
52.00
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 101-A (100169)
FEET FROM BOTTOM OF TANK

FIGURE A-7.1

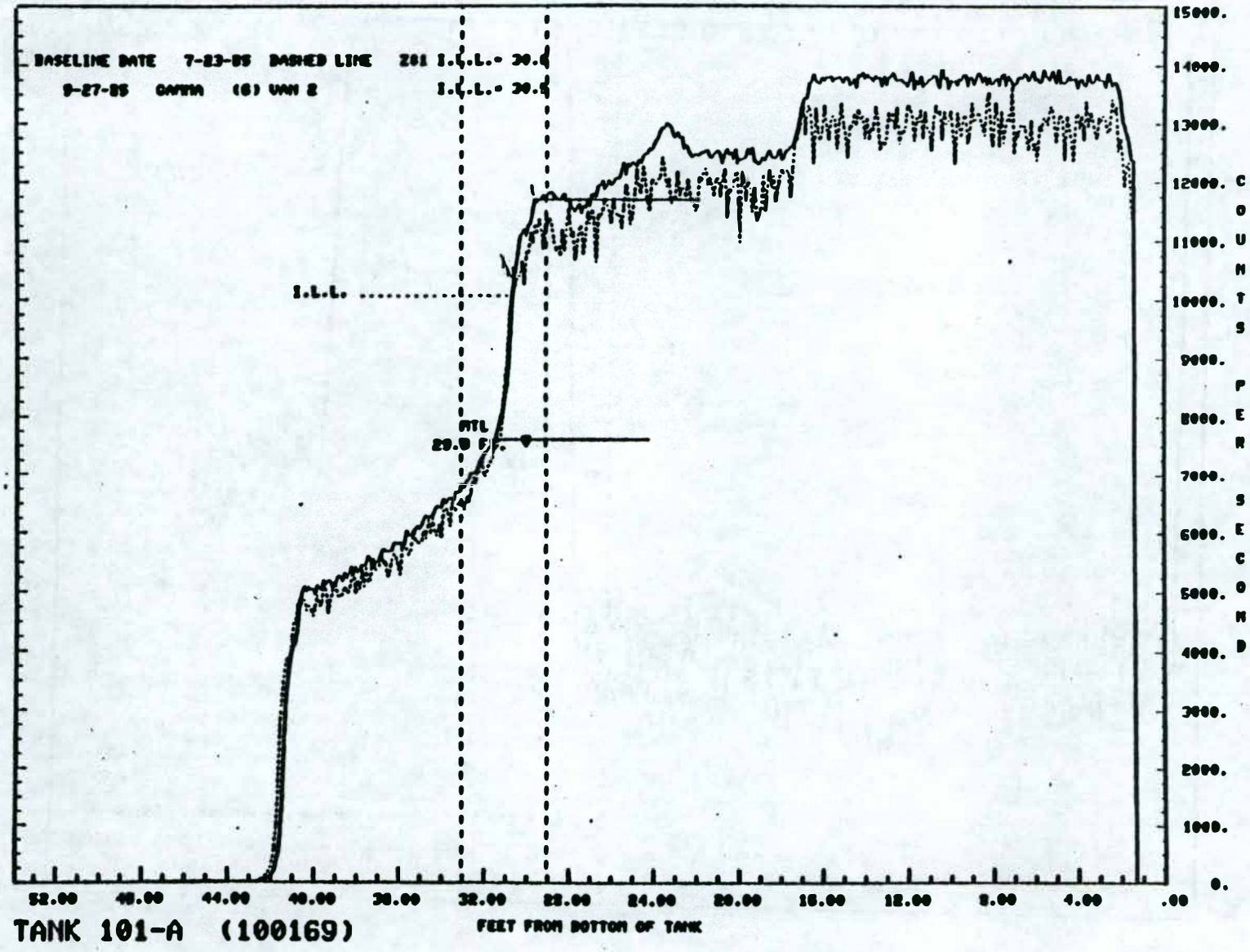

BASELINE DATE 7-23-95 DASHED LINE 201 I.L.L.= 30.4
9-27-95 CAVITY (6) VAN 2 I.L.L.= 30.4
I.L.L.
ATL
29.8 FT.
15000.
14000.
13000.
12000.
11000.
10000.
9000.
8000.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
COUNTS PER SECOND
52.00 48.00 44.00 40.00 36.00 32.00 28.00 24.00 20.00 16.00 12.00 8.00 4.00 .00
FEET FROM BOTTOM OF TANK
TANK 101-A (100169)

FIGURE A-7.2

intensity above the level corresponding to 14,000 cps. This would be an incorrect presentation of that gamma profile. It is not known if gamma radiation of this magnitude is, or will be, encountered. It is necessary that the effect be understood, should it happen.

With respect to the interpretation of this data, the best that can be ascertained is that the crust surface is around 31 feet and that the apparent gamma indicated ILL may be around 29.5 feet. It would be impossible to tell without other data, whether to assign the ILL at 29.5 feet or, perhaps, at 17 feet.

ACOUSTIC PROBE DATA

The acoustic probe scan of Figure A-7.3 shows a current ILL of 29.1 feet and a baseline of 29.3 feet. A second recent scan (Figure A-7.4) provides an ILL of 29.2 feet. Except for some minor inconsistency, this data appears straight forward. What also appears to be repeating in all acoustic scans (see also Figure A-7.5) is the surface of the crust at about 30.9 feet. As we've seen, this is somewhat unusual and would have no explanation without the supportive data from the other probes.

Discussion:

The method used by Example 5 to determine the ILL is the test which can be used to determine significant surface crusting. Crust thickness of less than about .75 foot will be increasingly more difficult to resolve. The heavy surface crusting of this tank is more than likely due to the higher temperature of the contents. The surface crust is still quite wet, insomuch, as the acoustic probe was able to resolve the thickness also. However, without neutron probe data, the crusting could only be suggested by the acoustic data. The gamma probe data is of only supportive value in that it can be used to corroborate other determinable data.

Conclusion:

TK-101A is a larger tank, containing higher level waste than has been routinely encountered. It is a non-pumped tank, but due to the crust formation, the ILL is not at the surface of the contents. Therefore, it can be classed as a Type I variant. It appears quite stable except at the surface. The gamma scan does imply some activity at 17 feet.

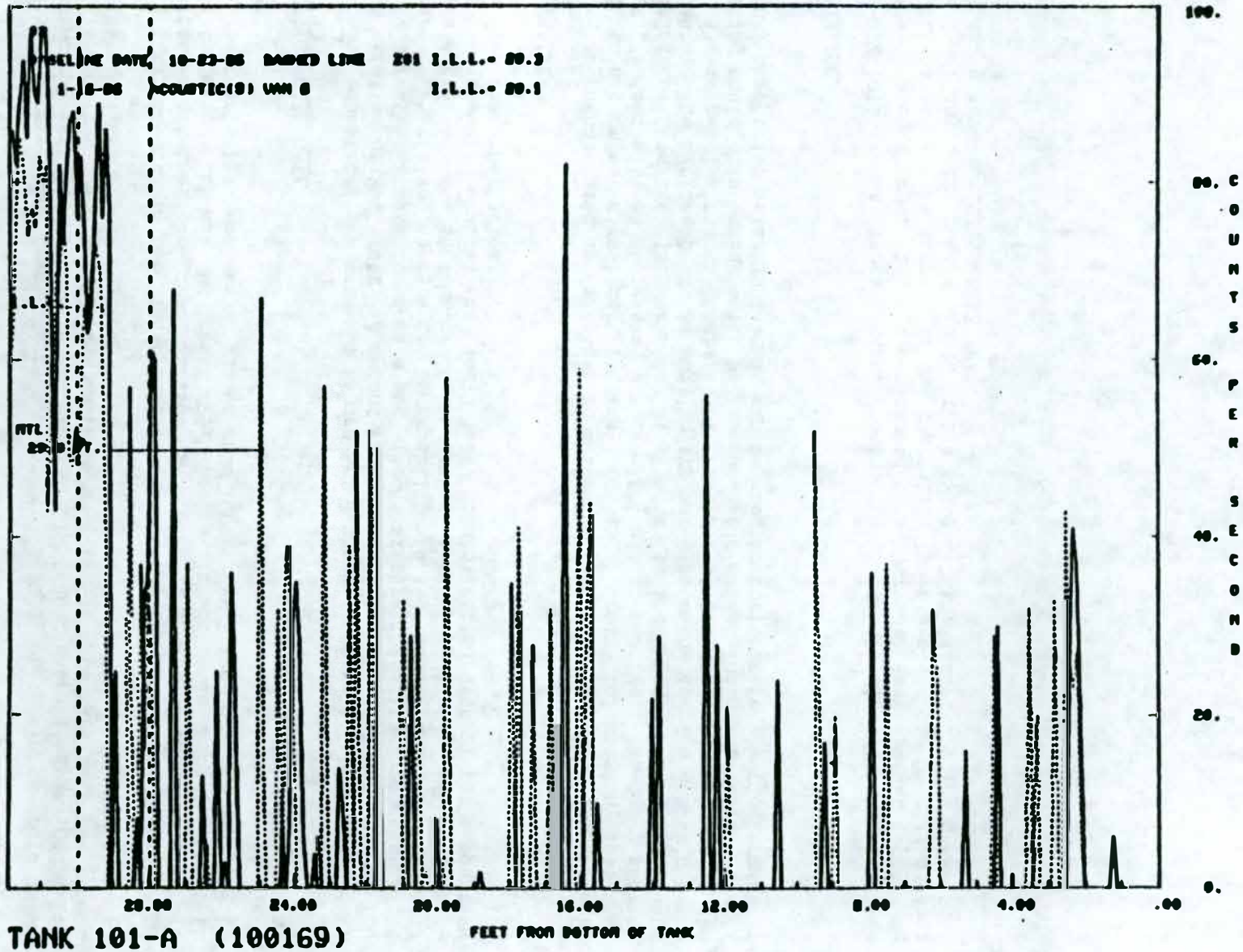

BASELINE DATE 10-22-96 DASHED LINE 201 I.L.L.= 80.3
1-16-96 ACOUSTIC(S) VAN 8 I.L.L.= 80.1
I.L.
INTL.
100.
80.
60.
40.
20.
0.
COUNTS
REFLECTED
20.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 101-A (100169)
FEET FROM BOTTOM OF TANK

FIGURE A-7.3

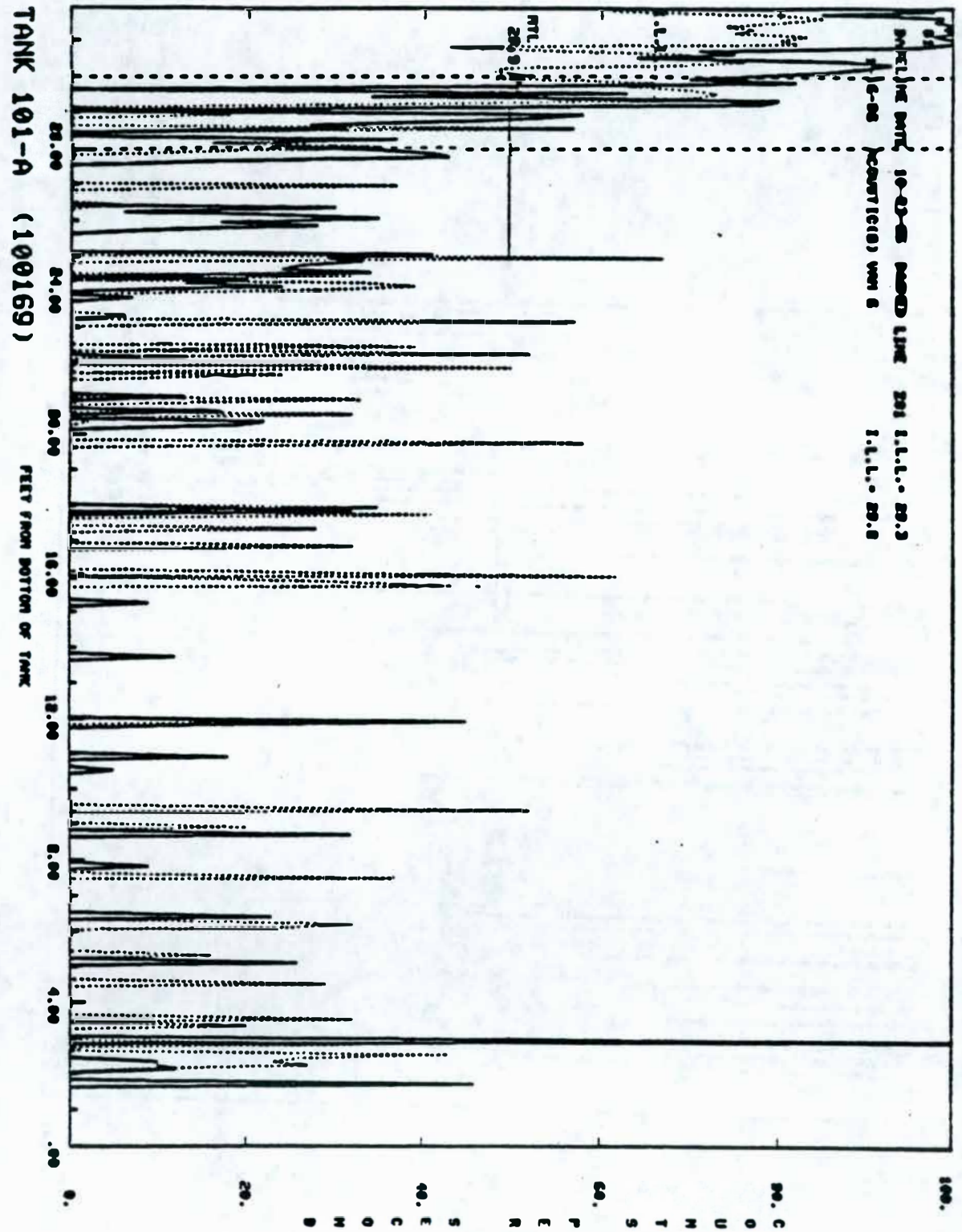

TANK 101-A (100169)
FEET FROM BOTTOM OF TANK
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
0.
20.
40.
60.
80.
100.

FIGURE A-7.4

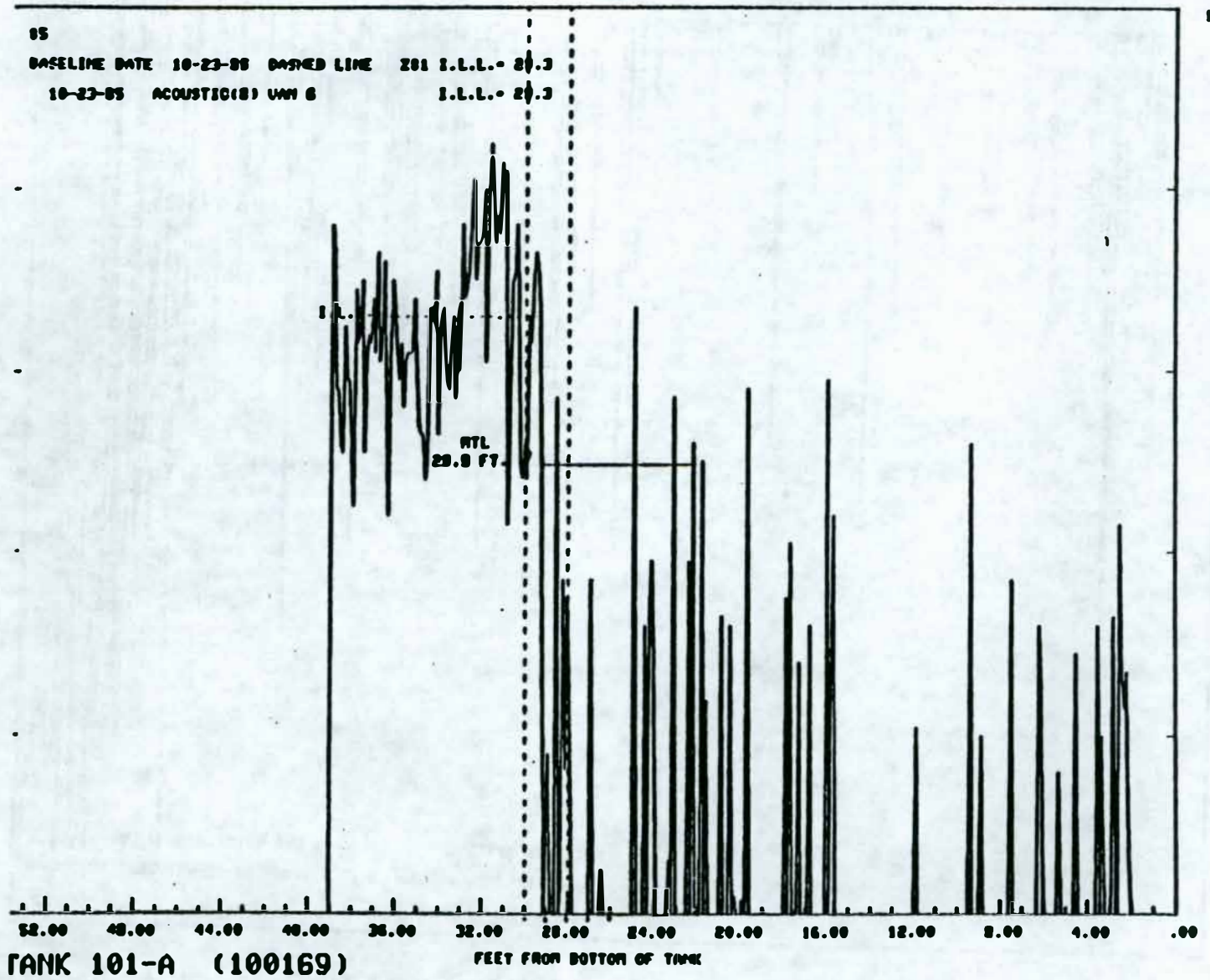

85
BASELINE DATE 10-23-85 DASHED LINE 201 I.L.L.= 29.3
10-23-85 ACOUSTIC(8) VAN 8 I.L.L.= 29.3
I.L.L.
RTL
29.8 FT.
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
52.00
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 101-A (100169)

FIGURE A-7.5

EXAMPLE 8: TK-110S

Acoustic scan data for this tank is available back to May 8, 1985. At least eighteen scans have been plotted for this tank that display a possible ILL range from 8 feet to 13 feet. Assign an ILL for this tank.

The Problem:

The LOW in this tank has a history of non-repeatable acoustic scan ILLs. To present a flavor of the problem, without the weight of the data, the following table was prepared:

Scan Date	Apparent ILL (Ft)	Possible ILL Range (Ft)	Scan Presentation
05/08/85 (1)	NONE	NONE	Not Usable
05/08/85 (2)	12.5	10-3/4 - 13	Good
05/08/85 (3)	12.3 - 12.8	8 - 13	Good
07/10/85 (1)	11.8		Excellent
07/10/85 (2)	11.8 - 12.5	11.8 - 12.5	Excellent
07/10/85 (3)	12.5	8 - 12.6	Good
08/14/85 (1)	12.3 - 12.5	12.3 - 12.7	Excellent
08/14/85 (2)	12.3 - 12.5	12.3 - 12.5	Excellent

Scan Date	Apparent ILL (Ft)	Possible ILL Range (Ft)	Scan Presentation
10/18/85 (1)	11.8	11.8 - 13.0	Excellent
10/18/85 (2)	13.4	12.0 - 13.4	Excellent
11/19/85 (1)	12.0	11.8 - 12.3	Excellent
11/19/85 (2)	12.3	11.5 - 12.3	Excellent
11/19/85 (3)	12.0	11.6 - 12.3	Excellent
01/29/86 (1)	11.9		Excellent
01/29/86 (2)	11.9 - 12.3	11.9 - 12.3	Excellent
01/29/86 (3)	12.0 - 13.0	12.0 - 13.0	Excellent

The "apparent" ILL column values were those choices for the ILL that appeared logical looking at the individual acoustic scans. These choices are probably not without bias, but even then, some cannot be succinctly defined. Note, that the range of values is from 11.8 feet to 13.4 feet and that all (except one) of the scans are rated good or better, with respect to readability.

It is interesting to group the data as follows:

Apparent ILL (Ft)	Times Appearing In Data
> 12.5	4
12.5	7
12.3	8
11.8 & 11.9	5
< 11.8	0

Informally, the data would tend toward an ILL of 12.4 feet, but this would not be acceptable if an ILL of 12.4 $\pm$ 0.2 were assigned as action criteria (actually, this will turn out to be the surface of a very wet crust).

The foregoing problem is more compounded if the data is correlated by date. Scans on the same date do seem to correlate, but the range between dates is too great. This tends to infer that the ILL may in fact be changing. Can this be resolved?

NEUTRON PROBE DATA

After having read through the document to this point, it should be obvious to everyone that the scan of Figure A-8.1 is that of an unpumped tank. Whether or not it is crusted, remains to be determined. This is a most important determination since a relatively thin wet crust would explain the non-repeatability of the acoustic data.

By the methods previously discussed, a value of about 12.2 feet is established for the surface, and 12.2 - 0.8 is 11.4 feet, the depth at which an intercept should be found if the liquid goes to the surface. The intercept value is only 11.2 feet. Thus, there appears to be a thin crust; varying probably, but at least 2.5 inches thick. This situation is so close to the non-crusted condition that end effects are undoubtedly influencing the scan. The apparent ILL then could be expected to be suppressed slightly. Thus, an end correction of 0.7 feet is estimated to be more correct (the estimate is in lieu of any empirical data). This would place the apparent ILL at 11.2 + 0.7 = 11.9 feet. (For basic compliance, 0.8 foot can still be used with a 12.0 foot ILL calculated value).

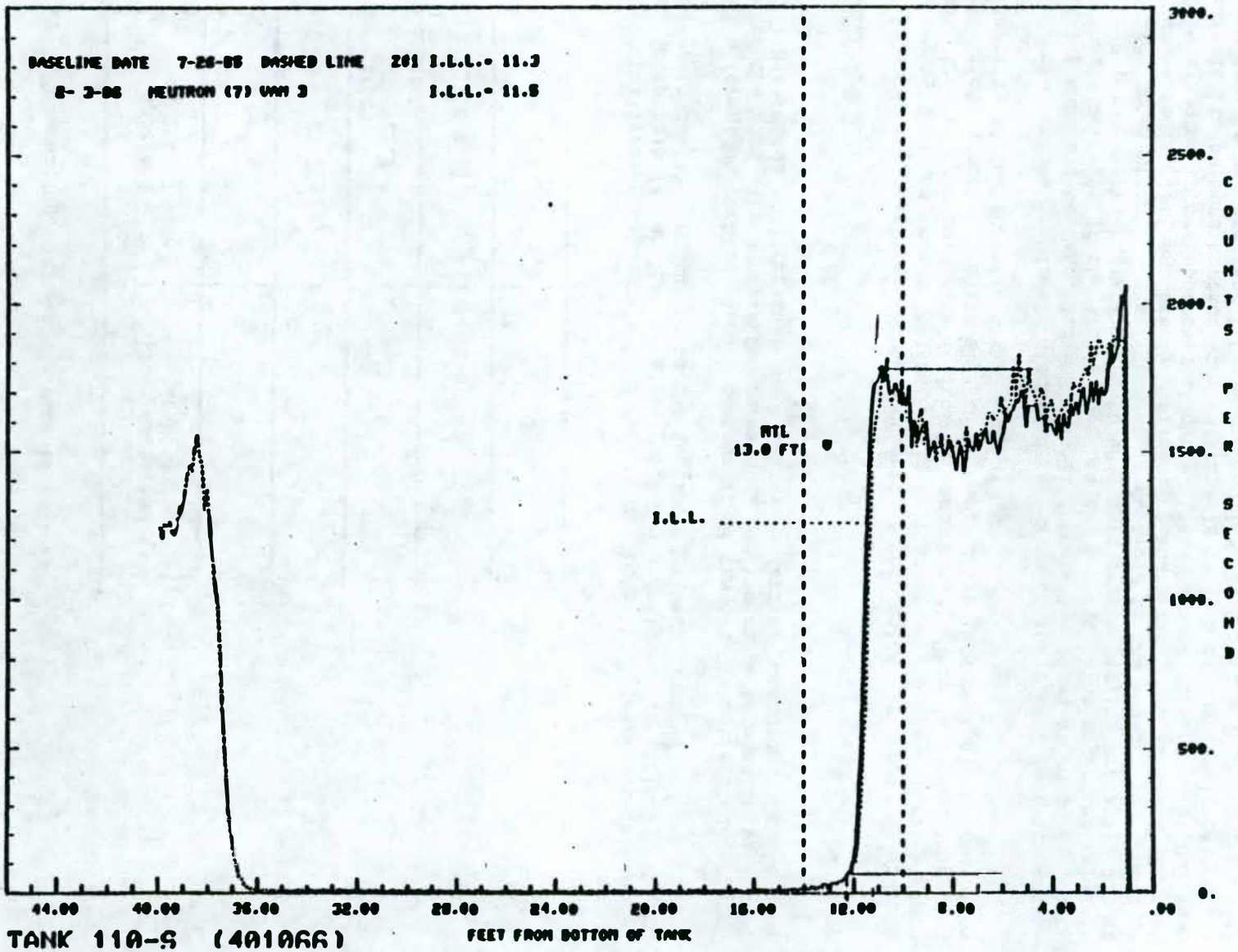

BASELINE DATE 7-28-88 DASHED LINE 201 I.L.L.= 11.3
8- 3-88 NEUTRON (7) VAM 3 I.L.L.= 11.5
RTL
13.0 FT
I.L.L.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
TANK 110-S (491066)
FEET FROM BOTTOM OF TANK

FIGURE A-8.1

Note, that the ILLs of Figure A-8.1 can be disregarded for the usual reason. Two scans (see Figure A-8.2) were done on this date that coincide nearly exactly and the compliance with the July data of the baseline is quite supportive. Thus, overall stability of the situation appears as one would expect.

GAMMA PROBE DATA

Figure A-8.3 provides an excellent correlation of the data taken on January 29, 1986 with the baseline taken in July. Relocating the upper and lower markers, still leaves the apparent ILL at the location shown. Unfortunately, this depth (determined from the scan) does not agree at all with the value (approximately 11.5 feet) shown. The value on repeated measurements is 11.8 feet. The surface is quite clearly indicated at about 12.3 feet. Note, that there has been a slope change of the ILL transition point from a surface gradient in July to a fairly well established transition on the current scan. This change would be expected to support acoustic probe ILL placement difficulties.

ACOUSTIC PROBE DATA

Figures A-8.4 and A-8.5 are enlarged acoustic probe scans, taken January 29, 1986. The ILLs shown, of course, are wrong and should be taken at about 30% amplitude. The ILLs are at 11.9 feet and are supported by the baseline of August 14, 1985.

Discussion:

Most of the pertinent considerations of this example have already been covered. We have shown that the considerable quantity of acoustic data has been influenced by a thin crust formation, whose moisture content has likely varied. Keep in mind, that the acoustic probe transitions on a relatively still wet environment. That is, it does not need to be dry to indicate dry. It simply needs not to be free liquid. Since the formation of the crust on an unpumped (or partially pumped) tank may be an equilibrium related happening, any change in conditions can influence surface crystallization and consequently the scan.

Conclusion:

TK-110S is a Type II partially jetpumped tank, with an assigned ILL of 11.9 feet. The tank contents appear to have a thin crust which may temporarily influence acoustic ILL measurements. Gamma scan indications, however, suggest that this transient nature has nearly passed and increasingly stabilized results, perhaps at a slightly lower level, will result.

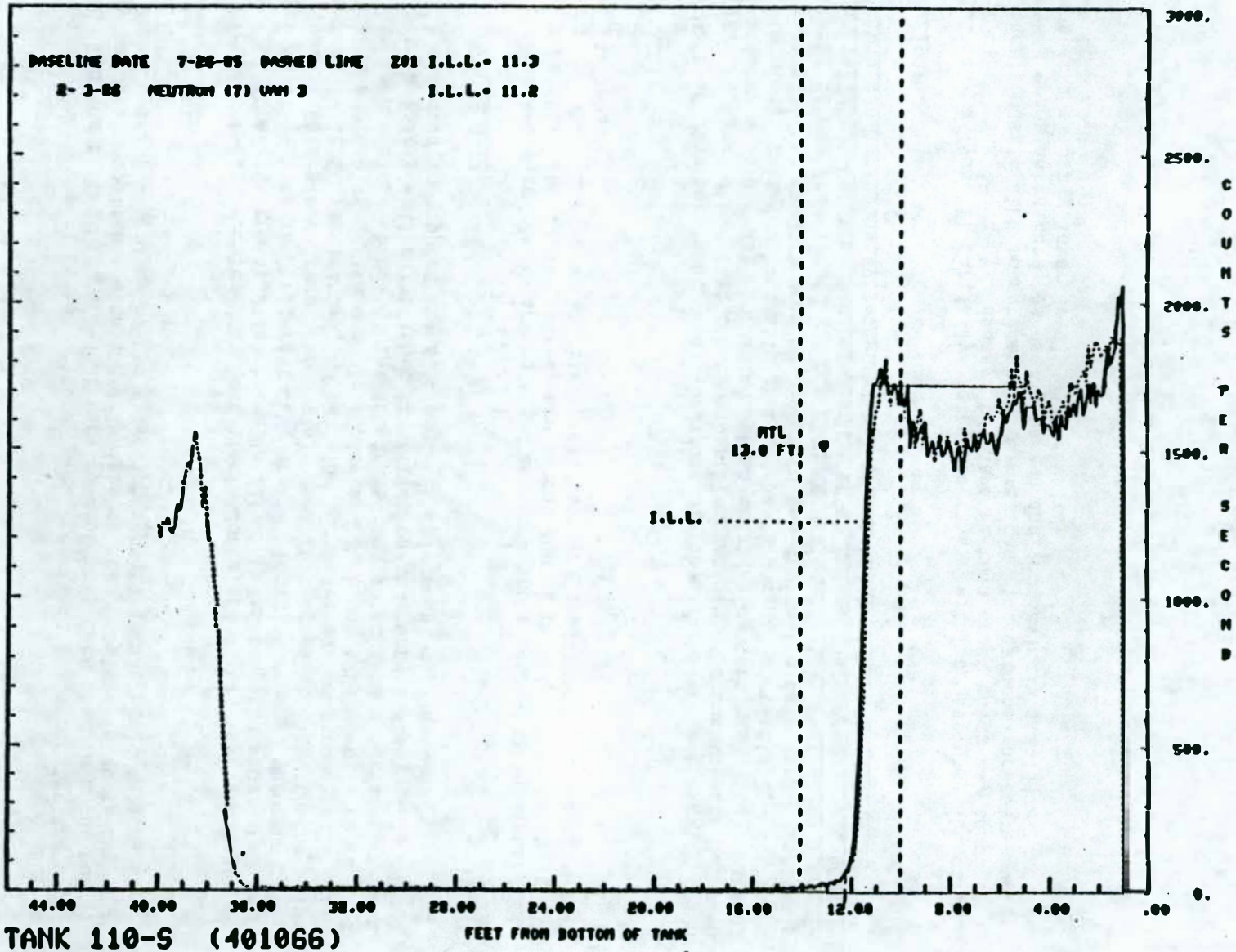

BASELINE DATE 7-26-85 DASHED LINE 201 I.L.L.= 11.3
8- 3-86 NEUTRON (T) UNH 3 I.L.L.= 11.8
ATL
12.0 FT
I.L.L.
3000.
2500.
2000.
1500.
1000.
500.
0.
COUNTS PER SECOND
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 110-S (401066)

FIGURE A-8.2

11.7

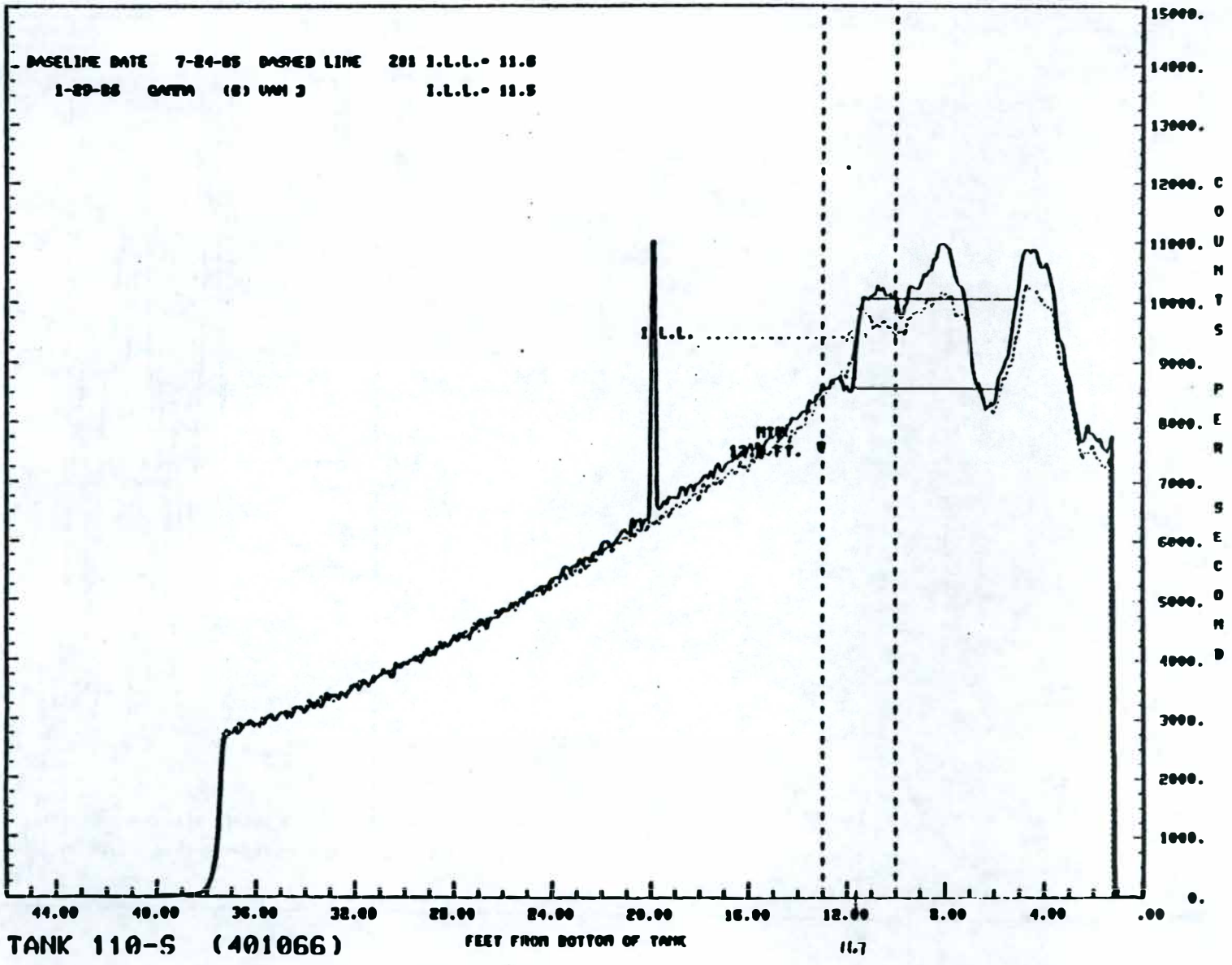


FIGURE A-3.3

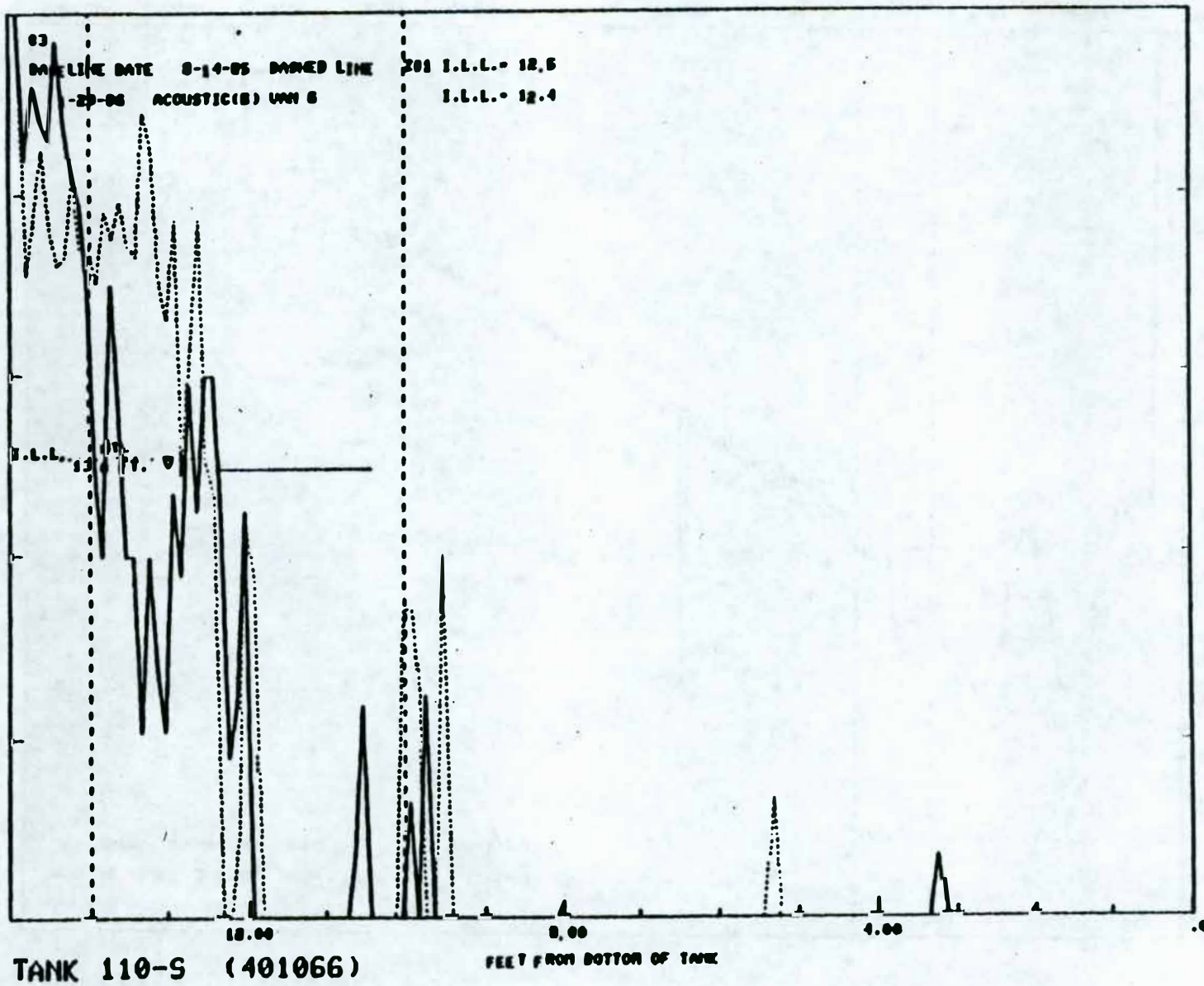
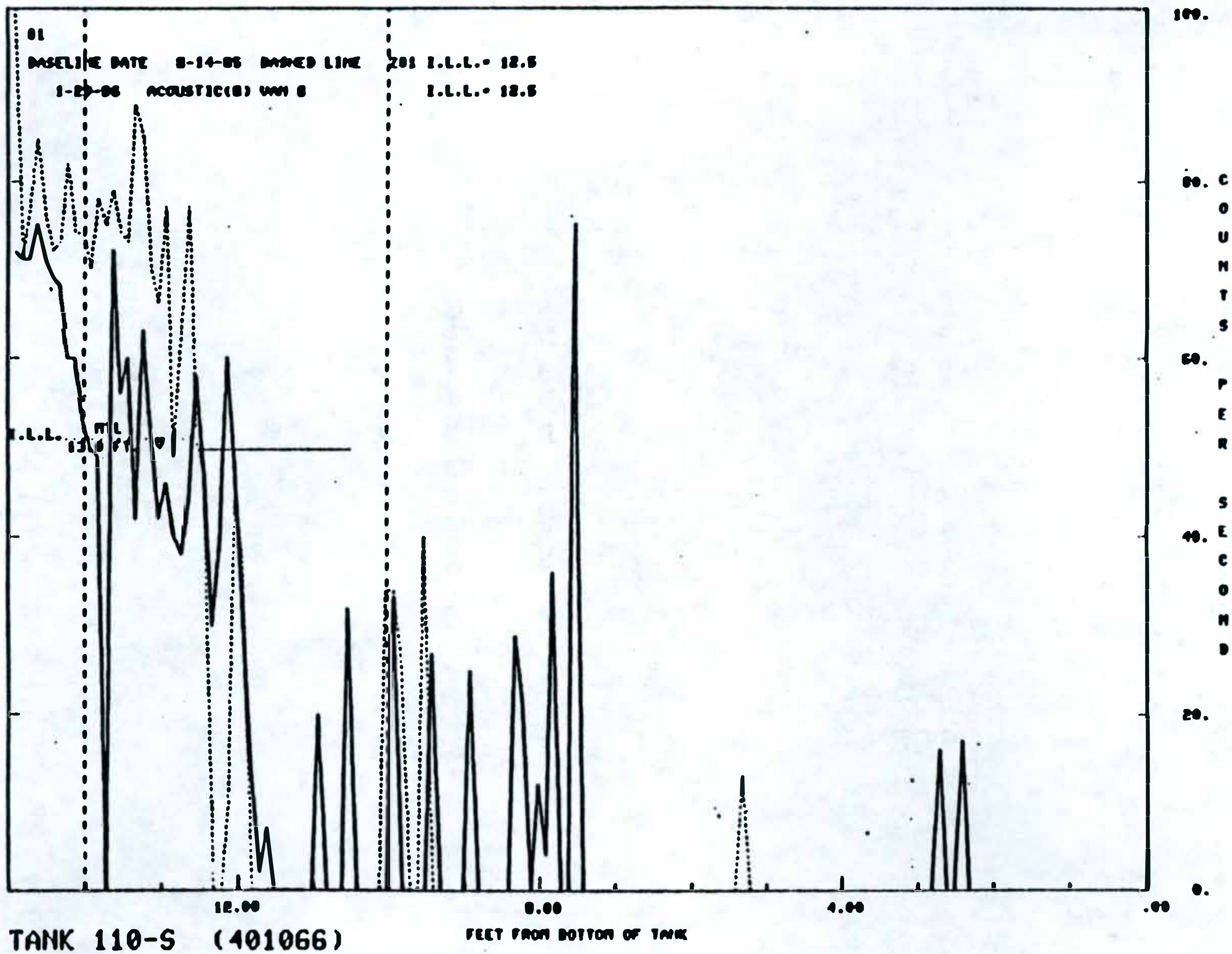

03
BASELINE DATE 8-14-95 DASHED LINE
-29-96 ACOUSTIC(B) VAN 6
201 I.L.L.= 12.5
I.L.L.= 12.4
I.L.L.= 11.0
100.
80.
60.
40.
20.
0.
COUNTS PER SECOND
10.00
8.00
4.00
.00
FEET FROM BOTTOM OF TANK
TANK 110-S (401066)

FIGURE A-8.4



TANK 110-S (401066)

FIGURE A-8.5

APPENDIX B

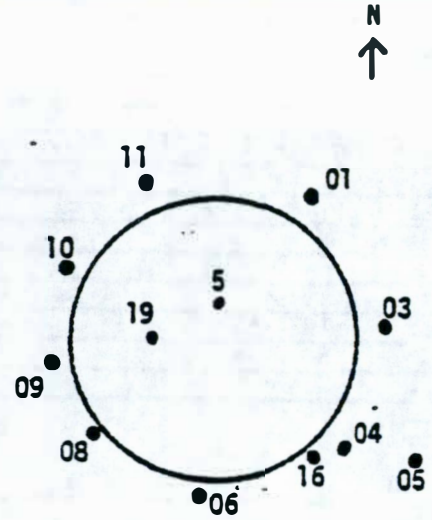
SUMMARY PAGES FROM RHO-CD-213

FOR

EACH TANK CONTAINING AN LOW

TANK: 101-A

RHO-CD-213
10-01-01



Riser and Drywell Locations

LOCATION: 241-A
COMPUTER CODE: 10-01
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 30' 3"
Capacity, Gals: 1,000,000
Bottom, Type: Flat
Volume (Gallons)=: (inches) 2750
Airlift Circ: Yes (4)
Coils: NONE
Exhauster: Yes
Construction Date: 1954-55
In-Service Date: 1-24-56
Out-Service Date: -

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-5)
FIC: NO
LOW: Yes (R-19) 10-01-69

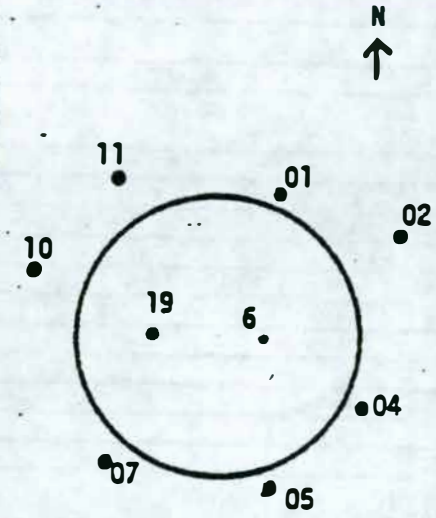
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (10)
Laterals: Yes (3)

TANK STATUS

CATEGORIZED Sound /Deactivated (11 21-80)
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY:
Installation: (P-10) 3-77
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 345.75 (MT) solids (See photo comments)
SOLIDS LEVEL (Inches): 346.60 = 953,000 (11-21-80) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 413,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 391,000
PHOTOGRAPHS: 93686 (11-19-80), 95123 (3-06-81), 8505749 (8-21-85)
8-21-85 photographs reveal an irregular cracked surface of saltcake with no visible liquid. Measurement anomalies can be expected because the manual tape plummet is contacting solids in a depression.

TANK: 103-A



Riser and Drywell Locations

LOCATION: 241-A
COMPUTER CODE: 10-03
TANK DESCRIPTION:
- Type: Single Shell
- Diameter: 75'
- Height: 30' 3"
- Capacity, Gals: 1,000,000
- Bottom, Type: Flat
- Volume (Gallons)=: (inches) 2750
- Airlift Circ: Yes (4)
- Coils: NONE
- Exhauster: Yes
- Construction Date: 1954-55
- In-Service Date: 5-17-76
- Out-Service Date:

LEAK DETECTION SYSTEM:
- Liquid Level
  - Manual Tape: NO
  - FIC: Yes (R-6)
  - LOW: Yes (R-19), 10-03-69
- Annulus System
  - Exhaust Radiation Detector: N/A
  - Leak Detection (Conductivity Probes): N/A
- Leak Detection Pit
  - Liquid Level: N/A
  - Specific Gravity: N/A
  - Radiation Detector: N/A
- External Drywells: Yes (7)
- Laterals: Yes (3)

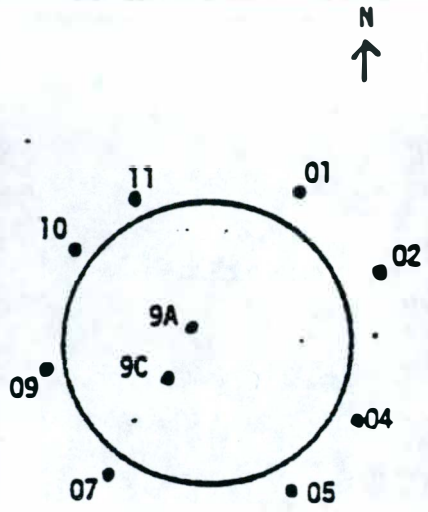
TANK STATUS

CATEGORIZED: Sound/Deactivated (8-14-80)
ISOLATION: Partially (12/15/82)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY:
- Installation: (P-10) 4-77
- Pumping Initiated:
- Completion Date:

MEAS. LEVEL (Inches): 186.30 (FIC) see Photo Comments
SOLIDS LEVEL (Inches): 181.50 = 499,000 Gals (8-14-80) saltcake
SUPERNATANT (Gallons): 17,000 (RE-SR-14, 11-85)
DRAINABLE INTERSTITIAL (Gallons): 208,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 203,000
PHOTOGRAPHS: 93055 (10-02-80), 98385 (10-08-81)

10-08-81 photos reveal a liquid surface largely covered by floating saltcake, which appears very porous. FIC measurement anomalies can be expected because the patch of liquid the FIC plummet is contacting is very small.

TANK: 101-AX



Riser and Drywell Locations

LOCATION: 241-AX
COMPUTER CODE: 11-01
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 30' 3"
Capacity, Gals: 1,000,000
Bottom, Type: Flat
Volume (Gallons)*: (inches) 2750
Airlift Circ: Yes (22)
Coils: NONE
Exhauster: No
Construction Date: 1963-64
In-Service Date: 1965
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: Yes (R-9C) Intrusion mode
LOW: Yes (R-9A), 11-01-60

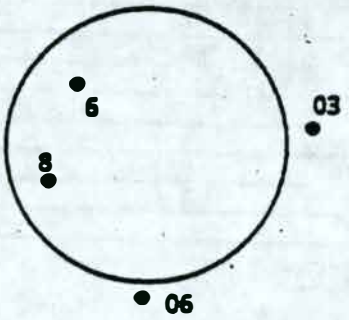
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: Yes
Specific Gravity: NO
Radiation Detector: Yes
External Drywells: Yes (8)
Laterals: NO

TANK STATUS

CATEGORIZED: Sound/Deactivated (11-12-80)
ISOLATION: Partially 12/15/82
STABILIZATION:
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY:
Installation: P-10 (3-77)
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 275.40 (FIC) solids
SOLIDS LEVEL (Inches): 272.00 = 748,000 Gals (5-6-82) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 320,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 298,000
PHOTOGRAPHS: 89890 (2-25-80), 98330 (10-06-81)
10-06-81 photos reveal an irregular cracked surface or saltcake with only a small puddle of liquid visible. The FIC plummet is contacting solids.

TANK: 104-B



RISER AND DRY WELL LOCATIONS

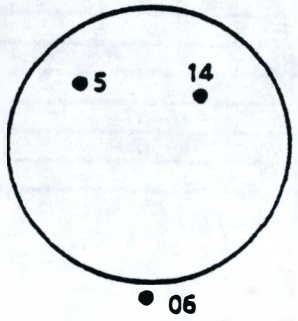
LOCATION: 241-B
COMPUTER CODE: 20-04
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75 ft
Height: 16 ft
Capacity, gal: 530,000
Bottom, Type: Dish
Volume (gal) = : (in.) 2,750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1943-44
In-Service Date: 8-46
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-8)
FIC: No
LOW: Yes (R-6) 20-04-70
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Dry Wells: Yes (2)
Laterals: None

TANK STATUS

CATEGORIZED: Stabilized (6-85)
ISOLATION: Interim (9-25-85)
STABILIZATION: Interim (6-28-85)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: None
Installation:
Pumping Initiated: Supernatant pumping (3-07-85)
Completion Date: 6-10-85
MEAS. LEVEL (in.): 131.50 (M-Tape) solids
SOLIDS LEVEL (in.): 130.00 = 370,000 gal (6-30-85) sludge and saltcake
SUPERNATANT (gal): 1,000 (RHO-RE-SR-14, 1-86)
DRAINABLE INTERSTITIAL (gal): 46,000
TOTAL JET PUMPED (gal): 0
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 89222 (1-03-80), 107832 (05-19-83), 8502296 (4-02-85), 8504599 (6-26-85)
6-26-85 photographs taken after pumping to a minimum heel show exposed solids with several small mounds. There is also shallow surface liquid visible (surface area ~30%). The manual tape donut is contacting solids.

TANK: 105-B



RISER AND DRY WELL LOCATIONS

LOCATION: 241-B
COMPUTER CODE: 20-05
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75 ft
Height: 16 ft
Capacity, gal: 530,000
Bottom, Type: Dish
Volume (gal) = : (in.) 2,750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1943-44
In-Service Date: 1-47
Out-Service Date:

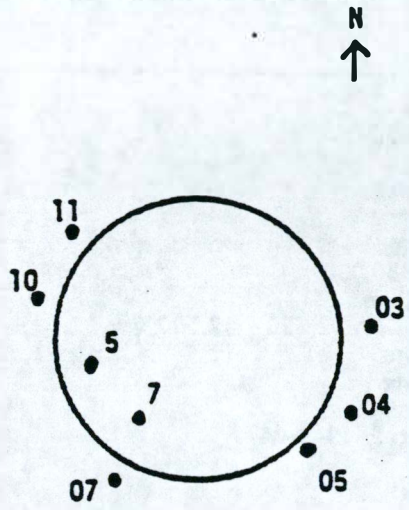
LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-14)
FIC: No
LOW: Yes (R-5) 20-05-71
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Dry Wells: Yes (1)
Laterals: None

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1978)
ISOLATION: Interim (10-30-85)
STABILIZATION: Interim (12-27-84)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY:
Installation: P-10 (4-72)
Pumping Initiated:
Completion Date: P-10 (6-74)
MEAS. LEVEL (in.): 40.75 (M-Tape) solids observation well reading
SOLIDS LEVEL (in.): 106.70 = 306,000 gal (12-30-84) saltcake and sludge
SUPERNATANT (gal): 0
DRAINABLE INTERSTITIAL (gal): 23,000
TOTAL JET PUMPED (gal): 0
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 94228 (1-15-81), 100230 (2-12-82), 8408614 (12-18-84)
2-12-82 photographs show heavy rust patterns on the side wall. The saltcake is collapsed and heavy salt formations and crystal growth are visible. A hole around the saltwell contains liquid. 12-18-84 photographs show no change from previous photographs.

TANK: 111-BX

21-11-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BX
COMPUTER CODE: 21-11
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 15'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: No
Construction Date: 1946-47
In-Service Date: 1950
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-7)
FIC: NO
LOW: Yes (R-5) 21-11-68

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (6)
Laterals: NONE

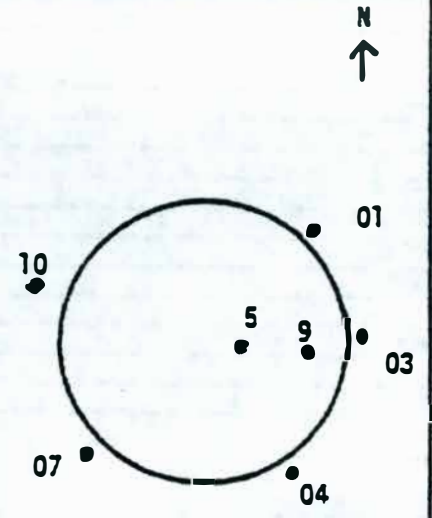
TANK STATUS

CATEGORIZED: Assumed Leaker (1984), Questionable Integrity (1976)
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Awaiting supernatant pumping, jet pumping questionable
Installation: P-10 (2-77)
Pumping Initiated:
Completion Date: P-10 (6-77)
LIQUID LEVEL (Inches): 81.20 (M-tape) see Photo Comments
SOLIDS LEVEL (Inches): 72.00 = 211,000 Gals (7-26-77) saltcake and sludge
SUPERNATANT (Gallons): 25,000
DRAINABLE INTERSTITIAL (Gallons): 50,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 53,000
PHOTOGRAPHS: 776949 (8-8-77), 90148 (3-06-80), 94753 (2-12-81), 104874 (12-07-82)

12-07-82 photos show a thin film of scum and floating solids on a large liquid surface; exposed solids are visible around the tank perimeter and the manual tape pencil plummet is contacting liquid. There is little change from photos taken on 2-12-81.

TANK: 101-BY

22-01-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-01
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: No
Construction Date: 1948-49
In-Service Date: 1-50
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-5)
FIC: NO
LOW: Yes (R-9A) 22-01-63

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

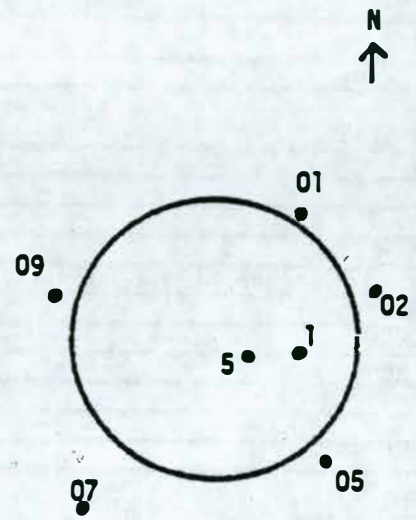
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION:
STABILIZATION: Interim (5-22-84), Primary 5-80)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping
Installation: P-10 (3-77)
Pumping Initiated: Jet (5-20-83)
Completion Date: P-10 (12-78), Jet (1-28-84)
MEAS. LEVEL (Inches): 146.75 (M-tape) solids
SOLIDS LEVEL (Inches): 148.00 = 387,000 Gals (4-28-82) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 5,000
TOTAL JET PUMPED (Gallons): 35,800
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 90337 (3-20-80), 95855 (4-23-81), 106099 (2-24-83)

2-24-83 photos show a dry irregular crusted surface with larger surface pools in the vicinity of the saltwell than previous photographs. The manual tape pencil plummet has created a hole in the saltcake surface and measurement anomalies have been experienced. Photos are not current because of jet saltwell pumping.

TANK: 102-BY



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-02
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (Inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: No
Construction Date: 1948-49
In-Service Date: 7-50
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-5)
FIC: NO
LOW: Yes (R-1) 22-02-63

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

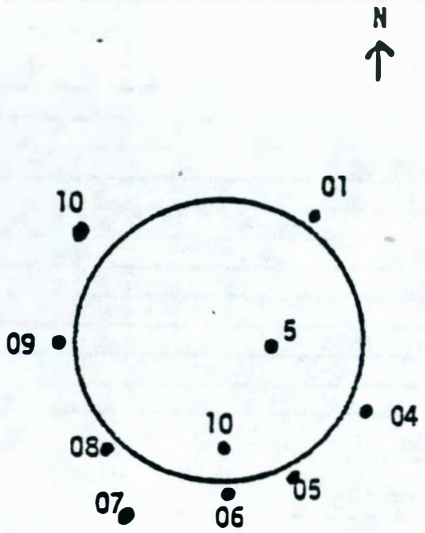
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation: P-10 (9-73)
Pumping Initiated:
Completion Date: P-10 (12-78)
LIQUID LEVEL (Inches): 165.50 (M-tape) see Photo Comments
SOLIDS LEVEL (Inches): 159.00 = 417,000 Gals (4-30-83) saltcake
SUPERNATANT (Gallons): 18,000
DRAINABLE INTERSTITIAL (Gallons): 176,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 172,000
PHOTOGRAPHS: 774579 (6-06-77), 88180 (9-27-79)
9-27-79 photographs show a wide band of exposed saltcake around the tank perimeter and a large deep liquid pool in the center of the tank. The manual tape donut plummet is contacting a clear liquid surface. Photos are not current.

TANK: 103-BY

22-03-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-03
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 11-50
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-5)
FIC: NO
LOW: Yes (R-10A) 22-03-66

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

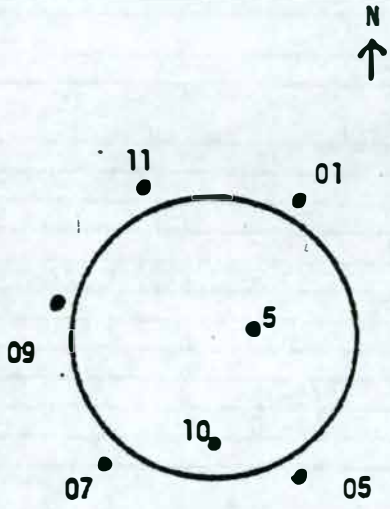
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (8)
Laterals: NONE

TANK STATUS

CATEGORIZED: Assumed Leaker (1984), Confirmed Leaker (5-73)
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (9-19-79)
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation: P-10 (9-73)
Pumping Initiated:
Completion Date: P-10 (11-78)
LIQUID LEVEL (Inches): 179.75 (M-tape) see Photo Comments
SOLIDS LEVEL (Inches): 174.00 = 459,000 Gals (4-28-82) saltcake
SUPERNATANT (Gallons): 15,000
DRAINABLE INTERSTITIAL (Gallons): 191,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 184,000
PHOTOGRAPHS: 89460 (1-17-80), 95112 (3-05-81), 98752 (11-09-81),8404877 (7-24-84)
3-05-81 photos show an uneven crusted surface with much more surface liquid than previous photos. 11-09-81 photos confirm an additional increase from intrusions and also a sluffing of saltcake off the outer edge of the tank. The manual tape plummet is contacting liquid. 7-24-84 photos confirm additional liquid level increases.

22-04-01
RHO-CD-213

TANK: 104-BY



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-04
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 2-51
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R5)
FIC: NO
LOW: Yes (R-10C) 22-04-66

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

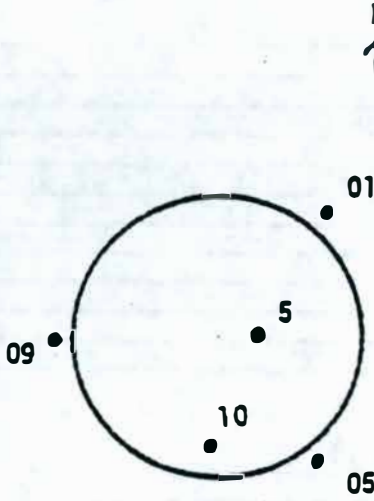
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Stabilized (1985)
ISOLATION:
STABILIZATION: Interim (1-25-85)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping
Installation: P-10 (1-77)
Pumping Initiated: Jet (5/20/83)
Completion Date: P-10 (1-77) Pump removed, Jet (11-01-84)
MEAS. LEVEL (Inches): 154.50 (M-tape) solids
SOLIDS LEVEL (Inches): 155.00 = 406,000 Gals (2-29-84) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 18,000
TOTAL JET PUMPED (Gallons): 329,500
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 7610431 (11-11-76), 779930 (9-30-77), 94686 (2-05-81) 107314 (4-27-83)
4/27/83 Photos are not current because of jet saltwell pumping.

22-05-01
RHO-CD-213

TANK: 105-BY



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-05
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 6-51
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-5)
FIC: NO
LOW: Yes (R-10B) 22-05-66

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

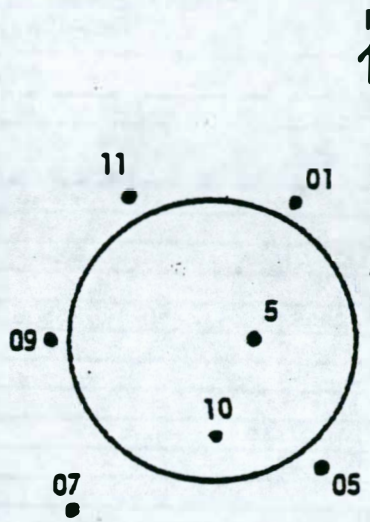
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (3)
Laterals: NONE

TANK STATUS

CATEGORIZED: Assumed Leaker (1984), Questionable Integrity (1974)
ISOLATION: Partially(12-15-82)
STABILIZATION: Primary
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation: P-10 (1-75)
Pumping Initiated:
Completion Date: P-10 (10-76) pump removed
MEAS. LEVEL (Inches): 188.50 (M-tape) solids
SOLIDS LEVEL (Inches): 190.50 = 503,000Gals (2-29-84) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 194,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 172,000
PHOTOGRAPHS: 764176 (4-15-76), 94685 (2-06-81), 104474 (11-09-82)
11-09-82 photos show an irregular crusted surface with a small pool of liquid at the pump and a small puddle of liquid several feet away. The manual tape donut is contacting solids in what appears to be a small depression.

TANK: 106-BY

22-06-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-06
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 1950
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-5)
FIC: NO
LOW: Yes (R-10B) 22-06-66

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

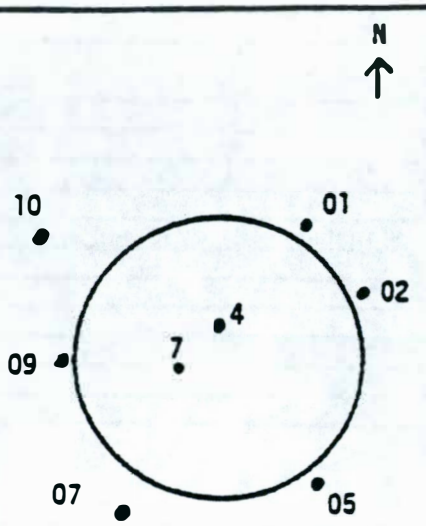
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Assumed Leaker (1984), Questionable Integrity (1977)
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation: P-10 (2-77)
Pumping Initiated:
Completion Date: P-10 (12-78)
MEAS. LEVEL (Inches): 240.50 (M-tape) solids - see Photo Comments
SOLIDS LEVEL (Inches): 241.00 = 642,000 Gals (4-28-82) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 235,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 213,000
PHOTOGRAPHS: 87790 (8-22-79), 94678 (2-05-81) 104475 (11-04-82)
11-04-82 photos show an uneven crusted surface of saltcake with several pools and small rivulets of liquid. The manual tape donut plummet is contacting an uneven surface of what appears to be floating saltcake.

TANK: 107-BY

22-07-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-07
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 12-50
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-4)
FIC: NO
LOW: Yes (R-7) 22-07-69

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

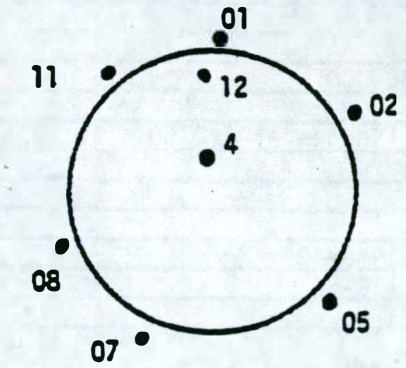
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (6)
Laterals: NONE

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1974)
ISOLATION: Interim (12-15-82)
STABILIZATION: Interim (7-79)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: P-10 (1-75), Jet (11-75)
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 105.50 (M-tape) solids
SOLIDS LEVEL (Inches): 104.00 = 266,000 Gals (2-29-84) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 25,000
TOTAL JET PUMPED (Gallons): 56,400
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 774671 (5-31-77), 87079 (6-21-79), 94253 (1-16-81)
1-16-81 photos show an irregular cracked surface of saltcake with a small pool of liquid around the saltwell that was not visible in previous photos. The manual tape donut plummet is contacting solids with discarded tapes in the immediate area.

TANK: 109-BY

22-09-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-09
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 195_0
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO (R-4)
FIC: YES
LOW: Yes (R-12B) 22-09-60

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

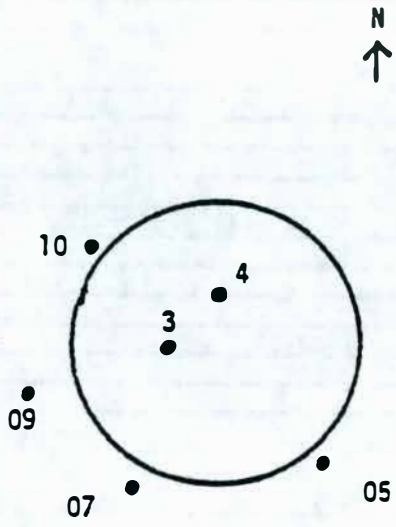
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (6)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated, Inactive (8-09-79)
ISOLATION:
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation: P-10 (4-77)
Pumping Initiated:
Completion Date:
LIQUID LEVEL (Inches): 181.40 (FIC) see Photo Comments
SOLIDS LEVEL (Inches): 168.00 = 441,000 Gals (2-29-84) saltcake and sludge
SUPERNATANT (Gallons): 37,000
DRAINABLE INTERSTITIAL (Gallons): 147,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 162,000
PHOTOGRAPHS: 771191 (2-04-77), 87319 (7-17-79), 107315 (4-27-83).
4-27-83 photos show more surface liquid than previous photos with several patches of floating saltcake or scumlike material. The FIC plummet is contacting liquid.

TANK: 110-BY

22-10-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-10
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 1951
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-4)
FIC: NO
LOW: Yes (R-3) 22-10-69

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

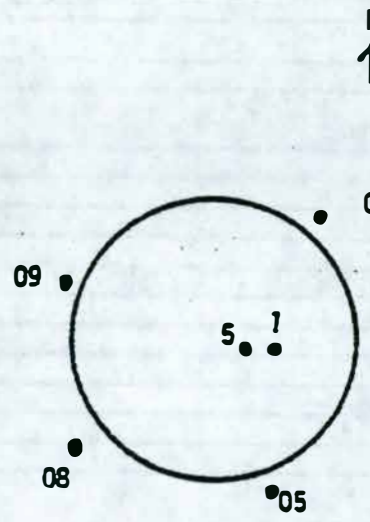
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (4)
Laterals: NONE

TANK STATUS

CATEGORIZED: Stabilized (1985)
ISOLATION:
STABILIZATION:
PROJECTED USAGE: Interim (1-25-85)
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: P-10 (1-77)
Pumping Initiated: Jet (5-20-83)
Completion Date: Jet (12-23-84)
MEAS. LEVEL (Inches): 151.75 (M-tape) solids
SOLIDS LEVEL (Inches): 152.00 = 398,000 Gals (2-29-84) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 9,000
TOTAL JET PUMPED (Gallons): 213,300
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 87744 (8-17-79), 107313 (4-27-83), 8405108 (7-26-84)
7-26-84 Photos reveal a very uneven surface of saltcake with no liquid visible.

TANK: 111-BY

22-11-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-11
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (Inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 1951
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-5)
FIC: NO
LOW: Yes (R-1) 22-11-63

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

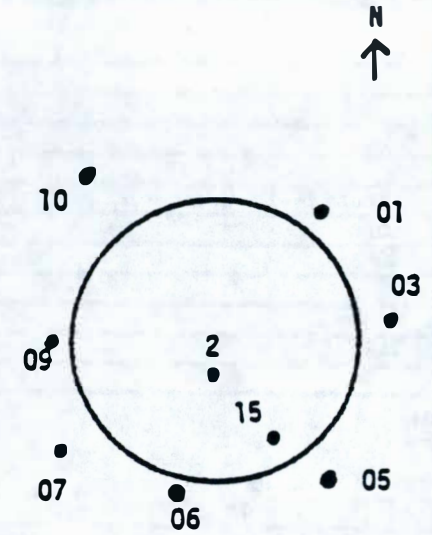
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (4)
Laterals: NONE

TANK STATUS

CATEGORIZED: Stabilized (1985)
ISOLATION:
STABILIZATION: Interim (1-25-85)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: P-10 (9-75)
Pumping Initiated: Jet (9-15-83)
Completion Date: P-10 (12-78), Jet (11-16-84)
MEAS. LEVEL (Inches): 174.25 (M-tape) solids - see Photo Comments
SOLIDS LEVEL (Inches): 174.30 = 459,000 Gals (2-29-84) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 0
TOTAL JET PUMPED (Gallons): 313,200
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 776341 (7-20-77), 7801336 (2-06-78), 94677 (2-05-81)
2-05-81 photos reveal a very irregular crusted surface of saltcake with small rivulets and pools of liquid toward the tank center. The manual tape plummet is contacting solids and a discarded tape is in the immediate area. Measurement anomalies can be expected. Photos are not current because of jet pumping. Rev. 04/11/85

TANK: 112-BY

22-12-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-BY
COMPUTER CODE: 22-12
TANK DESCRIPTION:
Type: Single Shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NO
Construction Date: 1948-49
In-Service Date: 1951
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-2)
FIC: NO
LOW: Yes (R-15) 22-12-65

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

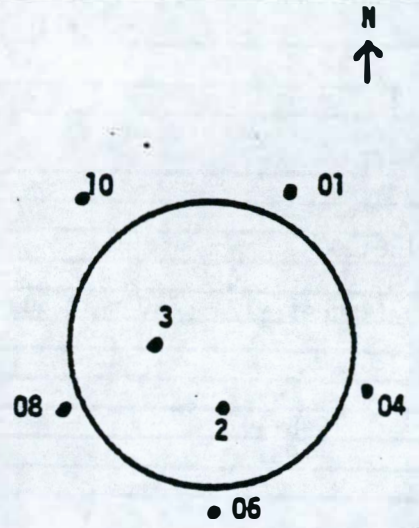
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (7)
Laterals: NONE

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION:
STABILIZATION: Primary, Interim (6-13-84)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping
Installation: P-10 (4-76)
Pumping Initiated: Jet (9-22-83)
Completion Date: P-10 (7-76), Jet (5-07-84)
MEAS. LEVEL (Inches): 113.00 (M-tape) see Photo Comments
SOLIDS LEVEL (Inches): 113.30 = 291,000 (2-29-84) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 8,000
TOTAL JET PUMPED (Gallons): 116,400
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 104978 (12-09-82), 110112 (10-18-83), 8405054 (7-18-84)
10-18-83 photos show an uneven surface of saltcake that has slumped and the manual tape plummet contacting solids in a depression. 7-18-84 Photos show little change from previous photos.

TANK: 101-S

40-01-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-01
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 7-17-53
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3), Intrusion mode
LOW: Yes (R-2) 40-01-66

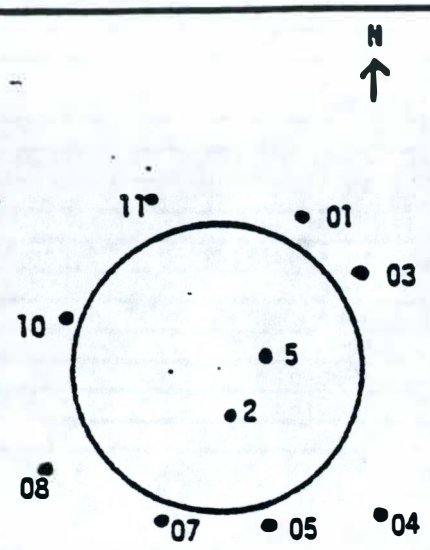
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: None, scheduled to be jet pumped
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 161.10 (FIC) See Photo Comments
SOLIDS LEVEL (Inches): 158.40 = 415,000 Gals (9-16-80) sludge and saltcake
SUPERNATANT (Gallons): 12,000 (RE-SR-14, 5-85)
DRAINABLE INTERSTITIAL (Gallons): 84,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 74,000
PHOTOGRAPHS: 93185 (10-14-80), 107133 (4-19-83).
4-19-83 Photographs show an uneven surface of floating saltcake (of varying thickness) and more surface liquid than previous photos. The FIC plummet now appears to be contacting a very shallow liquid puddle.

TANK: 102-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-02
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-2) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 1953
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-2)
LOW: Yes (R-5) 40-02-63

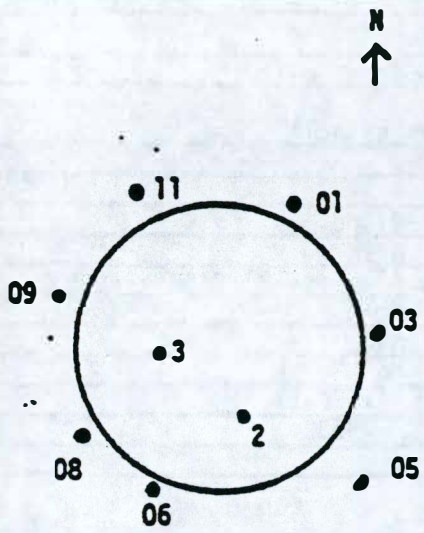
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (8)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: None, Scheduled to be jet pumped
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 202.90 (FIC) See Photo Comments
SOLIDS LEVEL (Inches): 207.00 = 549,000 Gals (4-28-82) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 230,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 208,000
PHOTOGRAPHS: 94524 (8-21-80), 105399 (1-12-83), 109182 (8-30-83)
8-30-83 photographs show an irregular crusted surface of saltcake with floating solids toward the center of the tank and more surface liquid than previous photos. The FIC plummet is no longer contacting soft solids but a dryer uneven surface of solids.

TANK: 103-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-03
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 11-01-53
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes(R-3)
LOW: Yes (R-2) 40-03-66

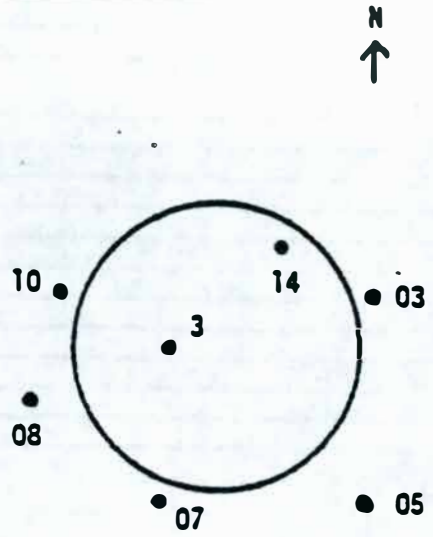
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (7)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: None, Scheduled to be jet pumped
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 103.0 (FIC) See photo comments
SOLIDS LEVEL (Inches): 91.5 = 231,000 gals (11-20-80) saltcake
SUPERNATANT (Gallons): 17,000 (RE-SR-14, 5-85)
DRAINABLE INTERSTITIAL (Gallons): 85,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 80,000
PHOTOGRAPHS: 7804574 (5-01-78), 86478 (4-27-79), 95696 (4-13-81), 111728 (1-31-84)
1-31-84 photographs show a liquid surface with solids visible beneath the surface and large areas (some floating) of exposed solids. The FIC plummet appears to be contacting soft solids, but is very difficult to see.

TANK: 105-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-05
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (Inches-12)2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 1953
Out-Service Date: 1974

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3)
LOW: Yes (R-14) 40-05-61

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

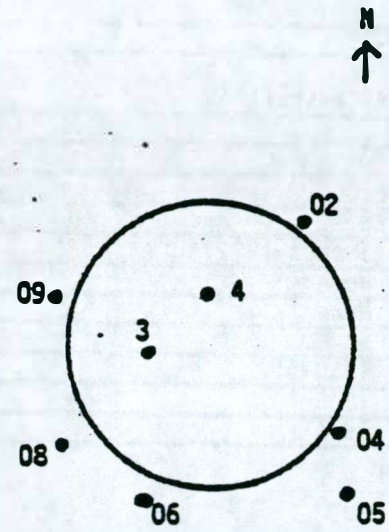
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (6-79)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet Saltwell Pumping
Installation: P-10 (9-74), Jet (8-78)
Pumping Initiated: Jet (8-78)
Completion Date: P-10 (11-75)
MEAS. LEVEL (Inches): 138.40 (FIC) solids
SOLIDS LEVEL (Inches): 185.00 = 488,00 gals (6-28-79) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 90,000
TOTAL JET PUMPED (Gallons): 114,300
TOTAL PUMPABLE REMAINING: 68,000
PHOTOGRAPHS: 84908 (12-14-78), 86744 (5-24-79), 92326 (8-04-80), 98650 (10-30-81)
10-30-81 photographs show an uneven heavily crusted surface of saltcake and a pool of liquid around the saltwell. The FIC plummet is contacting solids in a hole and measurement anomalies can be expected.

40-06-01
RHO-CD-213

TANK: 106-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-06
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 1953
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3)
LOW: Yes (R-4) 40-06-72

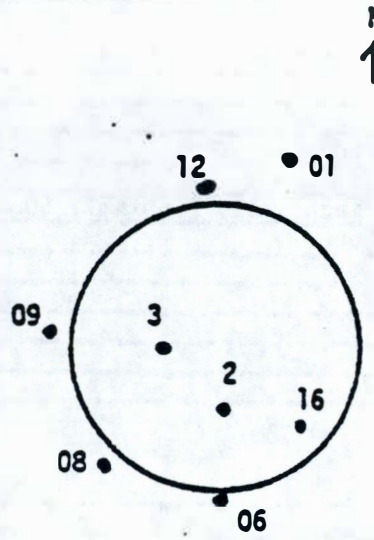
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (6)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping
Installation: Jet (8-78)
Pumping Initiated: Jet(8-78)
Completion Date:
LIQUID LEVEL (Inches): 163.80 (FIC), See photo comments
SOLIDS LEVEL (Inches): 205.00 = 543,000 gals (6-28-82) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 115,000
TOTAL JET PUMPED (Gallons): 99,800
TOTAL PUMPABLE REMAINING: 93,000
PHOTOGRAPHS: 98198 (10-01-81), 104708 (11-24-82), 8406916 (10-23-84)
10-23-84 photographs show a cracked uneven surface of saltcake with a pool of liquid under the FIC plummet and also around the saltwell and intank drywell casing. There appears to be more liquid than in previous photos, although some sluffing of solids is evident.

TANK: 108-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-08
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Da te: 1950-51
In-Service Date: 10-30-52
Out-Service Date: 1979

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-2)
FIC: Yes (R-3)
LOW: Yes (R-16) 40-08-65

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

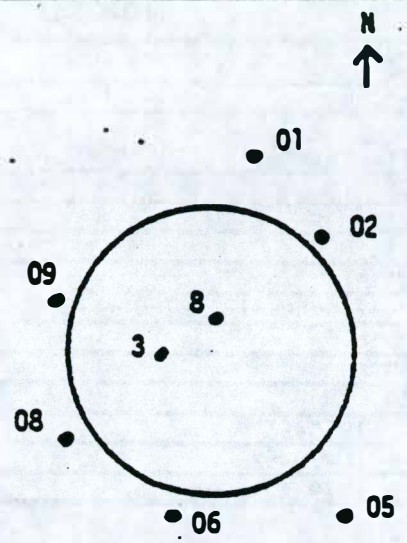
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (4-79)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet Saltwell Pumping
Installation: Jet (8-78)
Pumping Initiated: Jet (8-78)
Completion Date:
MEAS. LEVEL (Inches): 183.00 (FIC) Solids
SOLIDS LEVEL (Inches): 227.00 = 604,000 Gals (4-28-82) Saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 103,000
TOTAL JET PUMPED (Gallons): 151,600
TOTAL PUMPABLE REMAINING: 81,000
PHOTOGRAPHS: 86404 (4-20-79), 87525 (7-26-79), 92325 (8-04-80), 104707 (11-24-82)
11-24-82 photographs show a dry cracked uneven surface. The FIC plummet is contacting solids in a hole (created by the plummet) on the slope of a depression in the saltcake.

TANK: 109-S

40-09-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-09
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,0 0
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 12-23-52
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3)
LOW: Yes (R-8)40-.09-60

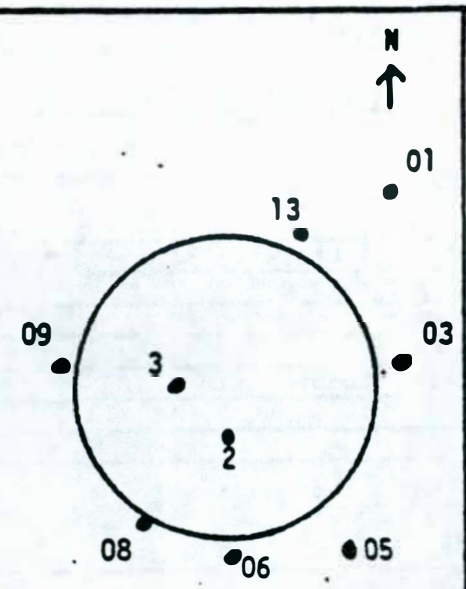
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (6)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (5-79)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet Saltwell Pumping
Installation: Jet (8-78)
Pumping Initiated: Jet (8-78)
Completion Date:
MEAS. LEVEL (Inches): 184.30 (FIC) solids
SOLIDS LEVEL (Inches): 214.00 = 568,000 Gals (9-30-75) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 124,000
TOTAL JET PUMPED (Gallons): 111,000
TOTAL PUMPABLE REMAINING: 10 2000
PHOTOGRAPHS: 86669 (5-17-79, 96635 (6-11-81), 97980 (9-17-81), 8405333 (8-24-84)
8-24-84 photographs show a dry cracked uneven surface of saltcake. The FIC plummet is in a large depression and measurement anomalies can be expected. There is now liquid visible around the saltwell casing.

TANK: 110-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-10
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (Inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 1952
Out-Service Date: 1979

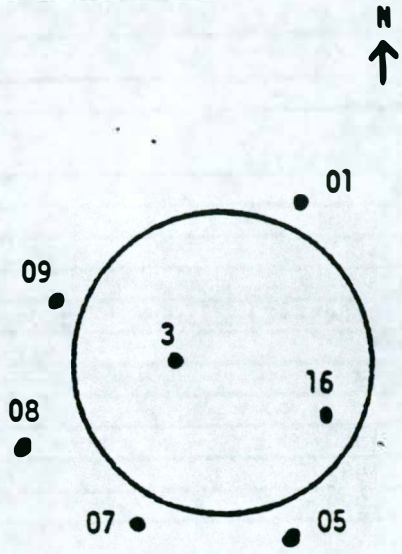
LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3)
LOW: Yes (R-2) 40-10-66

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (7)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (1-31-79)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet Saltwell Pumping
Installation: Jet (8-78)
Pumping Initiated: Jet (8-78)
Completion Date:
MEAS. LEVEL (Inches): 155.00 (FIC) Solids
SOLIDS LEVEL (Inches): 259.00 = 692,000 Gals (1-31-79) saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 60,000
TOTAL JET PUMPED (Gallons): 185,900
TOTAL PUMPABLE REMAINING: 38,000
PHOTOGRAPHS: 755079 (7-16-75), 757537 (10-14-75)
No current photographs.



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-11
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 1952
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3)
LOW: Yes (R-16) 40-11-65

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

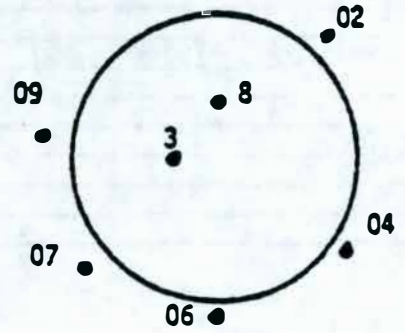
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (3-78)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet Saltwell Pumping
Installation: P-10 (10-75), Jet (1-76)
Pumping Initiated: P-10 (10-75)
Completion Date:
MEAS. LEVEL (Inches): 203.10 (FIC) See photo comments
SOLIDS LEVEL (Inches): 220.50 = 586,000 Gals (4-28-82) saltcake and sludge
SUPERNATANT (Gallons): 10,000 (RE-SR-14, 5-85)
DRAINABLE INTERSTITIAL (Gallons): 192,000
TOTAL JET PUMPED (Gallons): 3,300
TOTAL PUMPABLE REMAINING: 180000
PHOTOGRAPHS: 7803218 (3-27-78), 90746 (4-11-80), 107169 (4-19-83), 8403157 (5-09-84)

5-09-84 photos show a heavily crusted irregular surface of saltcake around the perimeter of the tank and saltcake falling away from the liner continues to be evident. A clear liquid surface (with some exposed solids) covers the remaining surface. The FIC plummet (not visible) would appear to be contacting liquid. Liquid level appears stable from photo comparisons.

TANK: 112-S



Riser and Drywell Locations

LOCATION: 241-S
COMPUTER CODE: 40-12
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons) =: (inches-12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1950-51
In-Service Date: 7-25-52
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-3)
LOW: Yes (R-8) 40-12-60

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

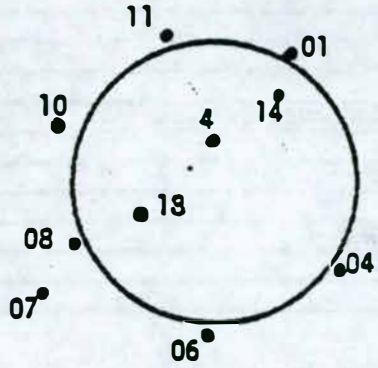
TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (6-79)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping
Installation: Jet (8-78)
Pumping Initiated: Jet (8-78)
Completion Date:
MEAS. LEVEL (Inches): 196.00 (FIC) solids
SOLIDS LEVEL (Inches): 239.00 = 637,000 Gals (6-28-82) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 144,000
TOTAL JET PUMPED (Gallons): 125,100
TOTAL PUMPABLE REMAINING: 122,000
PHOTOGRAPHS: 776248 (7-15-77), 86743 (5-24-79), 96634 (6-11-81)

6-11-81 photos show an irregular cracked crusted surface and liquid in a deep hole around the saltwell. The FIC plummet is contacting solids in a depression and measurement anomalies can be expected.

TANK: 101-SX

41-01-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-SX
COMPUTER CODE: 41-01
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 30' 9"
Capacity, Gals: 1,000,000
Bottom, Type: dish
Volume (Gallons)=: (inches-12) 2750 + 18,200
Airlift Circ: None
Coils: None
Exhauster: Sludge Cooler
Construction Date: 1953-54
In-Service Date: 5-54
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-18)
FIC: Yes (R-4) Intrusion mode
LOW: Yes (R-14) 41-01-61

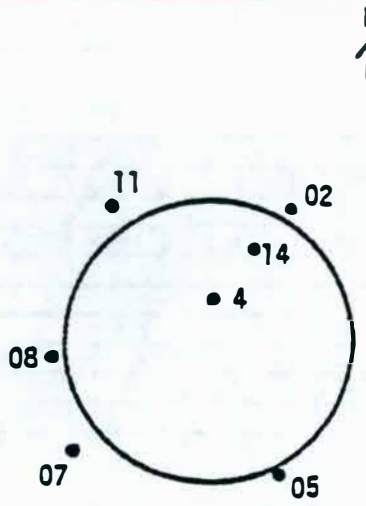
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (7)
Laterals: None

TANK STATUS

CATEGORIZED: Sound Deactivated (11-21-80)
ISOLATION: Partially (6-85)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell pumping program
SALTWELL STATUS/HISTORY: None
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 169.20 (FIC) See Photo comments
SOLIDS LEVEL (Inches): 171.00 = 455,000 Gals (10-29-80) Saltcake and sludge
SUPERNATANT (Gallons): 1,000 (RE-SR-14, 6-85)
DRAINABLE INTERSTITIAL (Gallons): 145,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 124,000
PHOTOGRAPHS: 96183 (5-12-81), 98495 (10-15-81), 100305 (2-19-82)
2-19-82 photographs show a dry cracked surface of sludge around the perimeter of the tank and a clear liquid surface toward the center, that continues to diminish in size. The FIC and manual tape plummet are now contacting surface solids in a small depression and measurement anomalies can be expected.

TANK: 102-SX



Riser and Drywell Locations

LOCATION: 241-SX
COMPUTER CODE: 41-02
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 30' 9"
Capacity, Gals: 1,000,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 18,200
Airlift Circ: None
Coils: None
Exhauster: Sludge cooler
Construction Date: 1953-54
In-Service Date: 5-54
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-4) Intrusion mode
LOW: Yes (R-14) 41-02-61

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

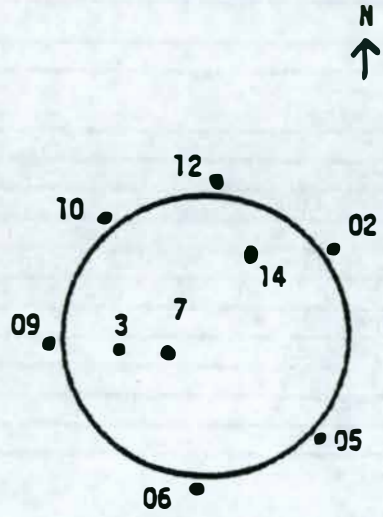
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated (8-15-80)
ISOLATION: Partially (6-85)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY: (P-10 (10-76) production only
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 202.20 (FIC) See photo comments
SOLIDS LEVEL (Inches): 203.00 = 543,000 Gals (4-28-82) Saltcake & Sludge
SUPERNATANT (Gallons): 0 (RE-SR-14, 6-85)
DRAINABLE INTERSTITIAL (Gallons): 183,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 161,000
PHOTOGRAPHS: 83473 (9-14-78), 91539 (6-05-80), 91717 (6-24-80), 8401845 (3-22-84)
3-22-84 Photographs reveal a irregular surface of solids with pools of liquid visible. The manual tape plummet is contacting solids and the FIC plummet appears to have penetrated the slurry forming a small hole of liquid.

TANK: 103-SX

41-03-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-SX
COMPUTER CODE: 41-03
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 30' 9"
Capacity, Gals: 1,000,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 18,200
Airlift Circ: None
Coils: None
Exhauster: Sludge cooler
Construction Date: 1953-54
In-Service Date: 5-54
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-7)
FIC: Yes (R-3)
LOW: Yes (R-14) 4]-03-6]

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

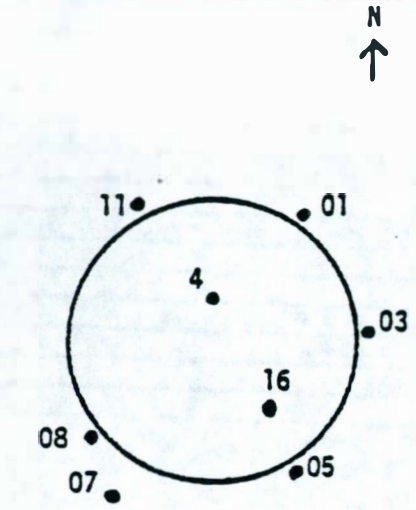
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes(6)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated (8-27-80)
ISOLATION: Partially (6-85)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY: None
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 246.40 (FIC) See photo comments
SOLIDS LEVEL (Inches): 236.00 = 635,000 Gals (8-27-80) Saltcake & sludge
SUPERNATANT (Gallons): 32,000 (RE-SR-14, 6-85)
DRAINABLE INTERSTITIAL (Gallons): 226,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 236,000
PHOTOGRAPHS: 89829 (2-20 80), 92605 (8-29-80), 105297 (1-04-83)
1-04-83 show little detail because of haze. The FIC and manual tape plummet are not visible and the surface appears to be liquid and floating surface solids.

TANK: 104-SX

RHO-CD-213
41-04-01



Riser and Drywell Locations

LOCATION: 241-SX
COMPUTER CODE: 41-04
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 30' 9"
Capacity, Gals: 1,000,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12(2750 + 18,200
Airlift Circ: None
Coils: None
Exhauster: Sludge cooler
Construction Date: 1953-54
In-Service Date: 2-55
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-4)
LOW: Yes (R-16) 41-04-65

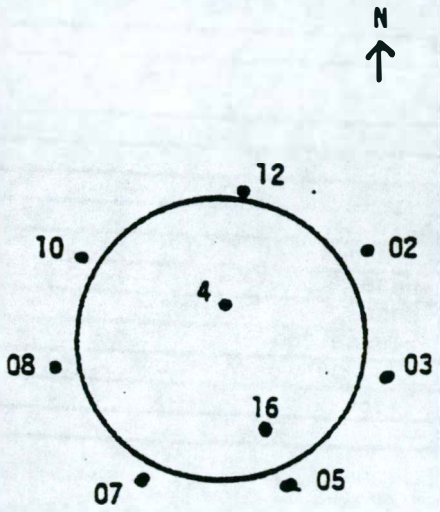
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Orywells: Yes (6)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated (8-18-80)
ISOLATION: Partially (6-85)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY: None
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 278.60 (FIC) See photo comments
SOLIDS LEVEL (Inches): 265.00 = 752,000 Gals (8-18-80)Saltcake and sludge
SUPERNATANT (Gallons): 0 (RE-SR-14, 6-85)
DRAINABLE INTERSTITIAL (Gallons): 250,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 228,000
PHOTOGRAPHS: 92446 (8-18-80), 95843 (4-22-81), 8400884 (2-14-84)
2-14-84 photographs show a crusted irregular surface of solids. The FIC measurement plummet is contacting solids and small pools and rivulets of liquid are now visible. Measurement anomalies can be expected.

TANK: 105-SX



Riser and Drywell Locations

LOCATION: 241-SX
COMPUTER CODE: 41-05
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 30' 9"
Capacity, Gals: 1,000,000
Bottom, Type: Dish
Volume (Gallons)=: (inches-12) 2750 + 18,200
Airlift Circ: None
Coils: None
Exhauster: Sludge cooler
Construction Date: 1953-54
In-Service Date: 2-55
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-4) Intrusion mode
LOW: Yes (R-16) 41-05-65

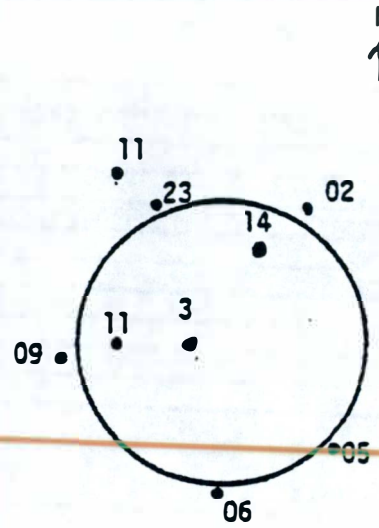
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (7)
Laterals: Yes (3)

TANK STATUS

CATEGORIZED: Sound / Reactivated (8-29-80)
ISOLATION: Partially (6-85)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY: None
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 254.10 (FIC) solids
SOLIDS LEVEL (Inches): 254.00 = 683,000 Gals (4-28-82) Saltcake & sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 261,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 239,000
PHOTOGRAPHS: 7912931 (12-17-79), 92606 (8-29-80), 107233 (4-20-83)
4-20-83 photographs reveal an uneven surface of saltcake that is cracked in some areas and appears to have flowed in others.

TANK: 106-SX



Riser and Drywell Locations

LOCATION: 241-SX
COMPUTER CODE: 41-06
TANK DESCRIPTION:
Type: Single-shell
Diameter: 75'
Height: 30'9"
Capacity, Gals: 1,000,000
Bottom, Type: Dish
Volume (Gallons)*: (inches-12) 2750 + 18,200
Airlift Circ: None
Coils: None
Exhauster: Sludge cooler
Construction Date: 1953-54
In-Service Date: 1954
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-11)
FIC: Yes(R-3) Intrusion mode
LOW: Yes (R-14) 41-06-61

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

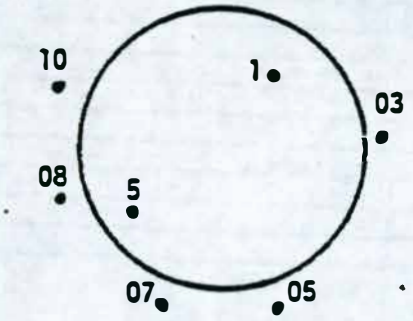
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (6)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated (10-28-80)
ISOLATION: Partially (6-85)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell pumping program
SALTWELL STATUS/HISTORY: None
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 190.00 (FIC) See photo comments
SOLIDS LEVEL (Inches): 179.00 = 477,000 Gals (10-28-80) Saltcake
SUPERNATANT (Gallons): 34,000 (RE-SR-14, 6-85)
DRAINABLE INTERSTITIAL (Gallons): 194,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 206,000
PHOTOGRAPHS: 94419 (1-23-81), 102843 (8-05-82), 108263 (6-16-83)
6-16-83 Photo comparisons show an uneven surface of saltcake, less exposed solids sloping from the tank liner and much more surface liquid around the tank perimeter. The FIC and manual tape plummet are contacting solids.

TANK: 104-T

SD-04-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-T
COMPUTER CODE: 50-04
TANK DESCRIPTION:
Type: Single-Shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1943-44
In-Service Date: 3-46
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Yes (R-5)
FIC: No
LOW: Yes (R-1) 50-04-61

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: None

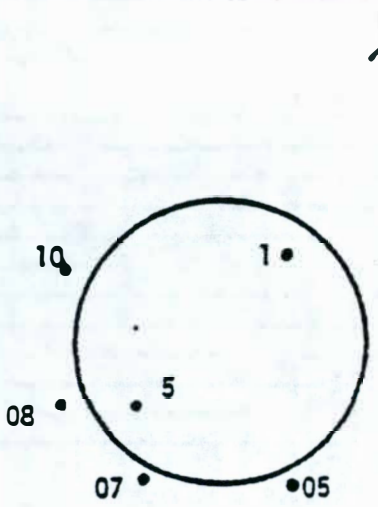
TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY:
Installation: P-10 (2-76)
Pumping Initiated:
Completion Date: P-10 (12-78)
MEAS. LEVEL (Inches): 155.50 (M-Tape) Solids - See photo comments
SOLIDS LEVEL (Inches): 156.00 = 442,000 Gals (4-28-82) Sludge
SUPERNATANT (Gallons): 3,000 (RE-SR-14, 7-85)
DRAINABLE INTERSTITIAL (Gallons): 47,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 44,000
PHOTOGRAPHS: 778986 (9-06-77), 90439 (3-28-80), 95283 (3-18-81), 8405334 (8-02-84)

3-18-81 Photographs reveal a surface of damp sludge, a larger band of liquid around the perimeter of the tank and a larger pool of liquid at the saltwell than previous photos. The manual tape pencil plummet is contacting sludge at the very edge of a small hole. 8-02-84 photos appear to have slightly more liquid around the edge of the tank.

RHO-CD-213
50-10-01

TANK: 110-T



Riser and Drywell Locations

LOCATION: 241-T
COMPUTER CODE: 50-10
TANK DESCRIPTION:
Type: Single-Shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1943-44
In-Service Date: 12-44
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-1)
LOW: Yes (R-5) 50-10-68

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

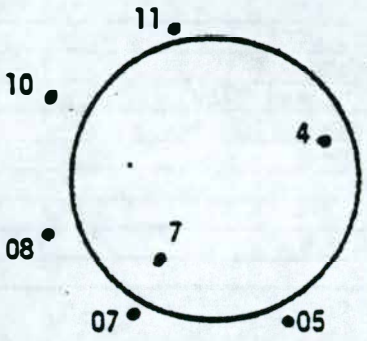
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (4)
Laterals: None

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY:
Installation: P-10 (2-76)
Pumping Initiated:
Completion Date: P-10 (11-78)
MEAS. LEVEL (Inches): 146.80 (FIC) Solids - See photo comments
SOLIDS LEVEL (Inches): 132.00 = 376,000 Gals (4-28-82) Sludge
SUPERNATANT (Gallons): 3,000 (RE-SR-14, 7-85)
DRAINABLE INTERSTITIAL (Gallons): 39,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 36,000
PHOTOGRAPHS: 778344 8-23-77), 90973 (4-30-80), 95684 (4-10-81), 8404997 (7-12-84)
4-30-80 Photographs show a crusted cracked surface of sludge sloping toward the center of the tank and a much larger pool of liquid around the saltwell casing than previous photos. 4-10-81 photos are basicly unchanged except for a slightly larger pool. The FIC plummet is contacting solids. 7-12-84 photos show little change from 4/10/81 photos. Rev. 09/11/85

RHO-CD-213
50-11-01

TANK: 111-T



Riser and Drywell Locations

LOCATION: 241-T
COMPUTER CODE: 50-11
TANK DESCRIPTION:
Type: Single-Shell
Diameter: 75'
Height: 16'
Capacity, Gals 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 +12,500
Airlift Circ: None
Coils: None
Exhauster: No
Construction Date: 1943-44
In-Service Date: 10-45
Out-Service Date: 4-74

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No
FIC: Yes (R-4)
LOW: Yes (R-7) 50-11-67

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

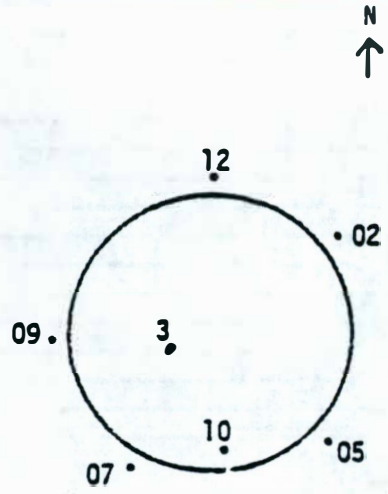
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: Yes (5)
Laterals: No

TANK STATUS

CATEGORIZED: Assumed Leaker (1984) ,Questionable Integrity (1974)
ISOLATION: Partially (12-15-82)
STABILIZATION: Primary (9-79)
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY:
Installation: P-10 (2-76)
Pumping Initiated:
Completion Date: P-10 (12-78)
MEAS. LEVEL (Inches): 161.80 (FIC) See photo comments
SOLIDS LEVEL (Inches): 161.25 = 456,000 Gals (4-28-82)
SUPERNATANT (Gallons): 2,000 (RE-SR-14, 7-85)
DRAINABLE INTERSTITIAL (Gallons): 49,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 45,000
PHOTOGRAPHS: 7801791 (2-16-78), 85084 (1-08-79), 94605 (1-30-81), 8405332 (8-01-84)
1-30-81 Photographs show a flat cracked, flag stone like surface of sludge and a larger liquid pool around the saltwell than previous photos. The FIC plummet is contacting a very small puddle of liquid in a depression caused by repeated plummet flushes. 8-01-84 photo comparisons show little change if any.

51-02-01
RHO-CD-213

TANK: 102-TX



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-02
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: None
Coils: None
Exhauster: None
Construction Date: 1947-48
In-Service Date: 01-21-50
Out-Service Date: -----

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-10 A)
FIC: NO
LOW: Yes (R-3) 51-02-69

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

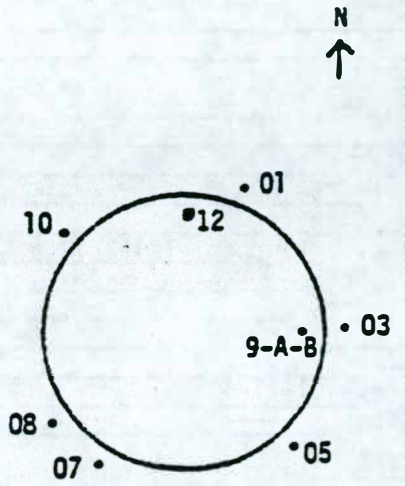
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Primary (3-78), Interim (4-05-83)
PROJECTED USAGE: None
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 3-77
Pumping Initiated: Jet (12-81)
Completion Date: (P-10) 3-77, Jet (11-14-82)
MEAS. LEVEL (Inches): 84.50 (M-TAPE) solids, see photo comments
SOLIDS LEVEL (Inches): 48.50 = 113,000 gals (10-31-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 22,000
TOTAL JET PUMPED (Gallons): 94,400
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 7802807 (3-17-78), 91654 (06-18-80), 102052 (6-09-82), 104477 (11-10-82)
11-10-82 photographs show a crusted uneven surface of saltcake with no visible liquid. The saltcake has slumped toward the tank center and the pencil plummet is contacting solids in a deep depression. Measurement anomalies can be expected if the manual tape plummet contacts solids at different elevations.

Rev. 10/11/85

TANK: 105-TX



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-05
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)*: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 3-02-51
Out-Service Date: -----

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-12)
FIC: NO
LOW: YES (51-05-63) Riser (9-B)

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

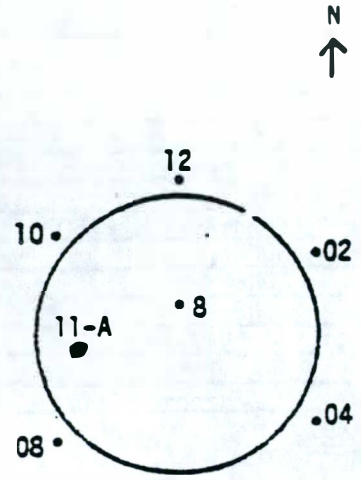
Leak Detection Pit
Liquid Level: , N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (6)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1977)
ISOLATION: Interim (8-84)
STABILIZATION: Primary (9/21/79), Interim (9-29-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 6-77
Pumping Initiated: (Jet) 3-82
Completion Date: (P-10) 8-77 Jet (8-8-83)
MEAS. LEVEL (Inches): 222.25 (M-TAPE) solids
SOLIDS LEVEL (Inches): 229.00 = 609,000 Gals (8-22-77) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 20,000
TOTAL JET PUMPED (Gallons): 121,500
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 7802808 (3-17-78) 93769 (12-03-80), 107054 (4-13-83)
4-13-83 Photographs show a very irregular, broken, crusted, surface of saltcake with many deep holes. The M-tape plummet is contacting solids in a depression.

TANK: 106-TX

51-06-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-06
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)*: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 6-16-51
Out-Service Date: ------

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-8)
FIC: NO
LOW: Yes (R-11A) 51-06-69

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

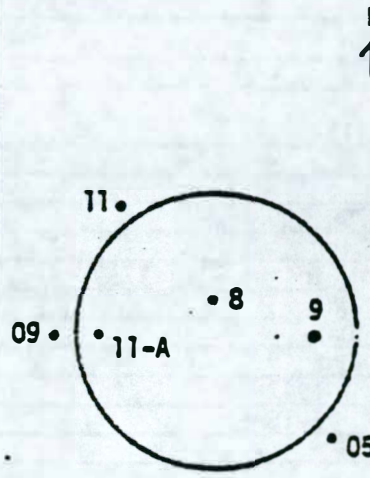
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Inactive (8-77), Interim (6-08-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation:
Pumping Initiated: Jet (12-81)
Completion Date: Jet (4-16-83)
MEAS. LEVEL (Inches): 148.00 (M-Tape) Solids
SOLIDS LEVEL (Inches): 172.00 = 453,000 Gals (8-29-77) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 10,000
TOTAL JET PUMPED (Gallons): 134,600
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 91413(5-28-80) 96365 (5-29-81) 102053 (6-09-82)
6-09-82 photographs show a crusted uneven surface, free of liquid. The manual tape plummet is contacting solids and a discarded tape is near the plummet.

TANK: 108-TX

51-08-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-08
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gal: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 1950
Out-Service Date: -------

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Riser (11A), tape removed
FIC: YES (R-8) Intrusion mode
LOW: Yes (R-9) 51-08-63

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

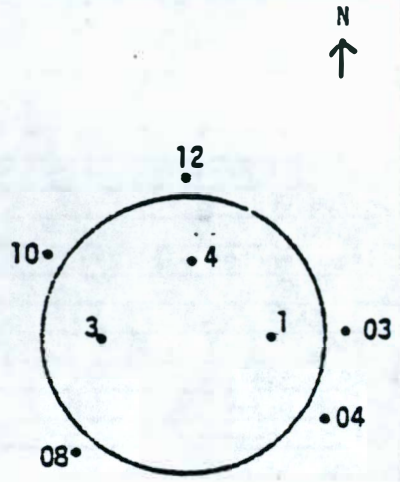
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (3)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Primary (5-78) , Interim (3-28-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 2-77
Pumping Initiated: (Jet) 12-81
Completion Date: (P-10) 2-77 Jet (1-12-83)
MEAS. LEVEL (Inches): 55.50 (FIC)
SOLIDS LEVEL (Inches): 56.00 = 134,000 Gals (05-30-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 0
TOTAL JET PUMPED (Gallons): 13,700
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 772957 (4-04-77) 91111 (5-12-80) 96369 (5-29-81), 107060 (4-12-83)
5-29-81 Photographs show a shallow liquid surface continuing to increase in size (no surface liquid in 4-04-77 photos). 4-12-83 Photos show the FIC and manual tape plummet contacting mounds of exposed saltcake with no visible liquid.

51-09-01
RHO-CD-213

TANK: 109-TX



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-09
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (Inches -12) 2750 +12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 1950
Out-Service Date: ----

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Riser (1), Tape removed
FIC: YES (R-4) Intrusion mode
LOW: YES (51-09-69) Riser (3)

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

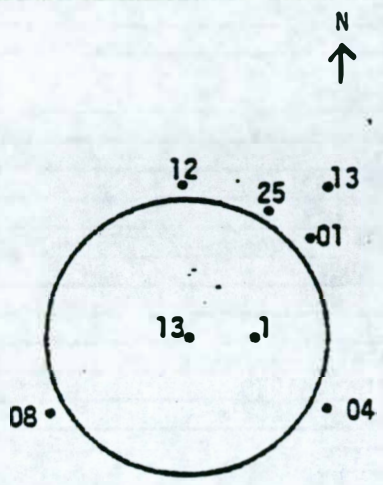
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Inactive (8-77), Interim (4-19-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 7-77
Pumping Initiated: (Jet) 3-82
Completion Date: (P-10) 7-77, Jet (3-4-83)
MEAS. LEVEL (Inches): 144.00 (FIC) solids
SOLIDS LEVEL (Inches): 147.00 = 384,000 Gals (5-30-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 10,000
TOTAL JET PUMPED (Gallons): 72,300
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 776437 (7-25-77) 91656 (6-18-80), 107102 (4-15-83)
4-15-83 Photographs show the FIC and manual tape plummet contacting solids. The FIC plummet appears to be directly over a hole in the saltcake. There is no visible liquid.

51-10-01
RHO-CD-213

TANK: 110-TX



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-10
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)*: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: YES (P-10)
Construction Date: 1947-48
In-Service Date: 9-49
Out-Service Date: ------

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-1)
FIC: NO
LOW: YES (51-10-60) Riser (13)

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

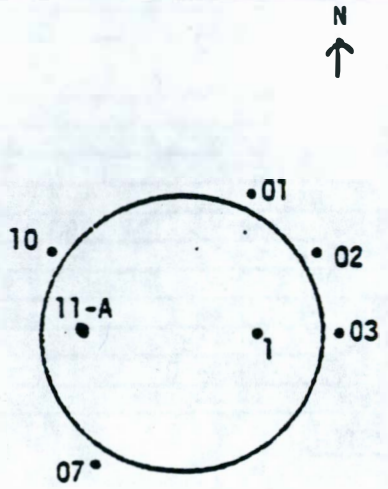
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (6)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1977)
ISOLATION: Interim (8-84)
STABILIZATION: Primary (8-77), Interim (4-5-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 7-77
Pumping Initiated: (Jet) 12-81
Completion Date: (P-10) 12-77, Jet (12-15-82)
MEAS. LEVEL (Inches): 170.50 (M-TAPE) solids
SOLIDS LEVEL (Inches): 175.50 = 462,000 Gals (5-30-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 15,000
TOTAL JET PUMPED (Gallons): 115,100
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 86130 (3-26-79) 91760 (6-30-80), 104013 (10-14-82), 107103 (4-15-83)
4-15-83 Photographs show an uneven surface of saltcake with no visible liquid. The manual tape was removed to obtain pictures, but would contact solids in a depression with a discarded donut and tape in the immediate area.

TANK: 111-TX

51-11-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-11
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 +12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: YES (P-10)
Construction Date: 1947-48
In-Service Date: 3-50
Out-Service Date: ----

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-1)
FIC: NO
LOW: Yes (R-11-A) 51-11-69

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

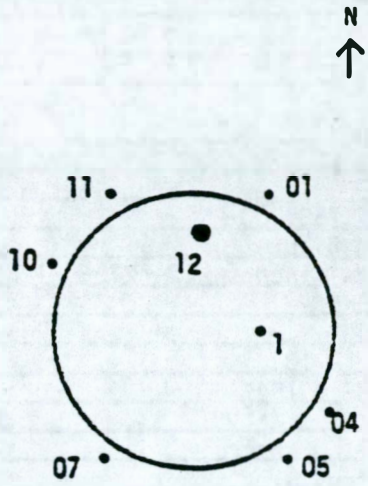
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Inactive (8-77), Interim (4-5-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 7-77
Pumping Initiated: (Jet) 1-82
Completion Date: (P-10) 7-77 Jet (12-15-82)
MEAS. LEVEL (Inches): 143.75 (M-TAPE) solids
SOLIDS LEVEL (Inches): 142.00 = 370,000 Gals (7-26-77) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 9,000
TOTAL JET PUMPED (Gallons): 98,400
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 86131 (3-26-79), 95069 (3-03-81), 106951 (4-06-83).
4-6-83 Photographs show a dry, cracked, uneven surface of saltcake with no visible liquid.

TANK: 112-TX

51-12-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-12
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: YES (P-10)
Construction Date: 1947-48
In-Service Date: 8-24-50
Out-Service Date: ----

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-1)
FIC: NO
LOW: YES (51-12-60) Riser (12)

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

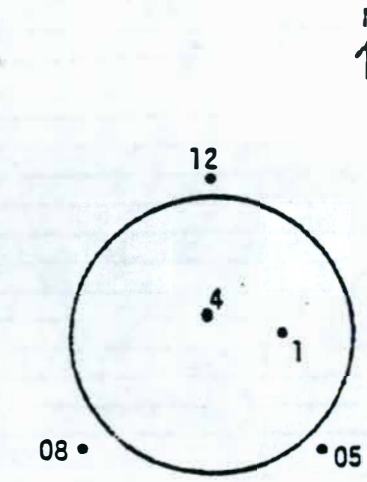
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (6)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Inactive (6-76), Interim (4-05-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 8-77
Pumping Initiated: Jet (12-81)
Completion Date: (P-10 01-77), Jet (11-17-82)
MEAS. LEVEL (Inches): 241.50 (M-TAPE) solids
SOLIDS LEVEL (Inches): 243.30 = 549,000 Gals (5-30-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 24,000
TOTAL JET PUMPED (Gallons): 94,000
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 91761 (6-30-80), 96417 (6-03-81), 107040 (4-12-83).
4-12-83 Photographs show a dry uneven surface of saltcake with no visible liquid. The manual tape donut plummet is contacting solids in a small depression.

TANK: 113-TX

51-13-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-13
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches - 12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 12-50
Out-Service Date: 1971 (salt filled)

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-1)
FIC: NO
LOW: Yes (R-4) 51-13-60

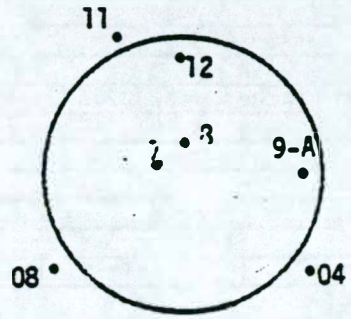
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (3)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1974)
ISOLATION: Interim (8-84)
STABILIZATION: Primary (3-78), Interim (4-05-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 12-74
Pumping Initiated: Jet (3-82)
Completion Date: (P-10) 3-76, Jet (5-11-82)
MEAS. LEVEL (Inches): 224.50 (M-TAPE) solids
SOLIDS LEVEL (Inches): 228.00 = 507,000 Gals (5-30-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 16,000
TOTAL JET PUMPED (Gallons): 19,200
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 89600 (1-29-80), 94420 (1-23-81), 107004 (4-11-83).
4-11-83 Photographs show an uneven surface of saltcake and no visible liquid. The manual tape pencil plummet is contacting solids in a hole.

TANK: 114-TX 51-14-01 RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-14
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)*: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 4-51
Out-Service Date: 1971

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-8)
FIC: NO
LOW: YES (51-14-60) R-12A (51-14-63) R-9A (51-14-69) R-7

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (3)
Laterals: NO

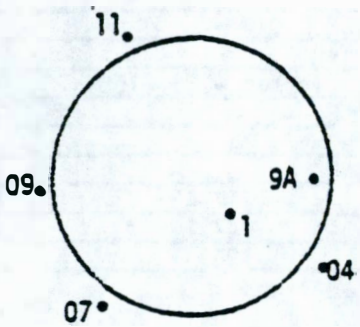
TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1974)
ISOLATION: Partially (12-15-82) Interim (8-84)
STABILIZATION: Primary (9-78), Interim (4-05-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 11-74
Pumping Initiated: Jet (1-82)
Completion Date: (P-10) 10-76 Jet (11-24-82)
MEAS. LEVEL (Inches): 205.00 (M-TAPE)
SOLIDS LEVEL (Inches): 202.00 = 535,000 Gals (5-30-83) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 15,000
TOTAL JET PUMPED (Gallons): 104,300
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 7710213 (10-07-77), 91414 (5-28-80), 92850 (9-22-80), 104014 (10-14-82), 106996 (4-11-83). 9-22-80 Photographs continue to show a larger liquid pool at the saltwell than 5-28-80 and 10-07-77 photos. 4-11-83 Photographs show a dry uneven surface of saltcake.

Rev. 10/11/85

TANK: 115-TX

51-15-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-15
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches - 12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 1951
Out-Service Date: -----

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (R-1)
FIC: NO
LOW: YES (51-15-63) Riser 9-A

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

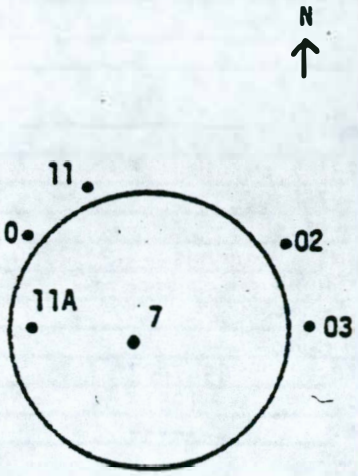
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (4)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1977)
ISOLATION: Partially (2-03-83), Interim (8-84)
STABILIZATION: Primary (3-78), Interim (9-29-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation: (P-10) 7-77
Pumping Initiated: Jet (4-82)
Completion Date: (P-10) 7-77, (8-08-83) Jet
MEAS. LEVEL (Inches): 209.00 (M-TAPE) solids
SOLIDS LEVEL (Inches): 240.00 = 640,000 Gals (3-31-73) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 19,000
TOTAL JET PUMPED (Gallons): 99,100
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 87286 (7-13-79), 94471 (1-28-81), 106703 (3-28-83).
1-28-81 Photographs show the manual tape plummet contacting solids and a larger pool of liquid at the saltwell than previous photos. 3-28-83 photographs show no visible liquid. The manual tape plummet is contacting saltcake near the edge of a depression caused by slumpage from saltwell pumping.

TANK: 117-TX

51-17-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-17
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1947-48
In-Service Date: 4-51
Out-Service Date: 1969

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: YES (11-A)
FIC: NO
LOW: Yes (R-7) 51-17-69

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

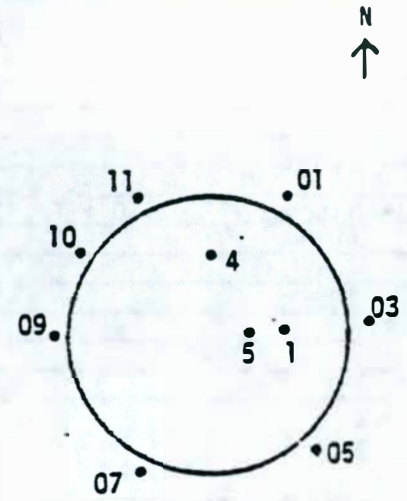
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (4)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984), Questionable Integrity (1977)
ISOLATION: Interim (8-84)
STABILIZATION: Primary (9-78), Interim (3-28-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation:
Pumping Initiated: Jet (12-81)
Completion Date: (P-10) 4-71, Jet (6-06-82)
MEAS. LEVEL (Inches): 187.25 (M-TAPE) solids
SOLIDS LEVEL (Inches): 235.00 = 626,000 Gals (12-31-71) saltcake & diatomaceous earth.
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 8,000
TOTAL JET PUMPED (Gallons): 54,300
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 90130 (3-05-80), 98942 (11-11-81), 106997 (4-11-83).
4-11-83 photographs show mounds of diatomaceous earth with no visible liquid. The manual tape plummet is over a deep hole where a pump has been removed.

TANK: 118-TX

51-18-01
RHO-CD-213



Riser and Drywell Locations

LOCATION: 241-TX
COMPUTER CODE: 51-18
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: YES (P-10)
Construction Date: 1947-48
In-Service Date: 4-51
Out-Service Date: ----

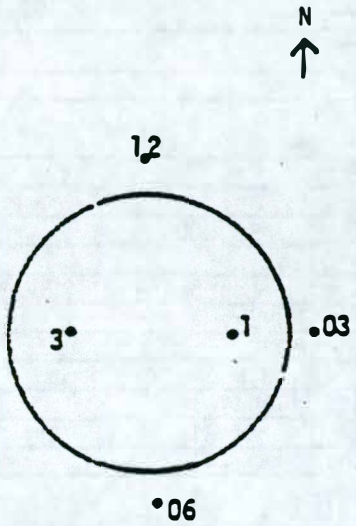
LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: Riser (1), tape removed
FIC: YES (R-4) Intrusion mode
LOW: YES (51-18-63) Riser (5)

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (7)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984)
ISOLATION: Interim (8-84)
STABILIZATION: Inactive (11-17-80), Interim (4-05-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed
Installation:
Pumping Initiated: Jet (2-82)
Completion Date: Jet (2-11-83)
MEAS. LEVEL (Inches): 113.80 (FIC)
SOLIDS LEVEL (Inches): 133.60 = 347,000 Gals (11-17-80) saltcake
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 27,000
TOTAL JET PUMPED (Gallons): 89,100
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 89144 (12-19-79)
No current photographs because of jet saltwell pumping.



Riser and Drywell Locations

LOCATION: 241-TY
COMPUTER CODE: 52-03
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 23'
Capacity, Gals: 758,000
Bottom, Type: Dish
Volume (Gallons)=: (inches -12) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1951-52
In-Service Date: 7-16-53
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-1) Intrusion mode
LOW: YES (52-03-69) R-3

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

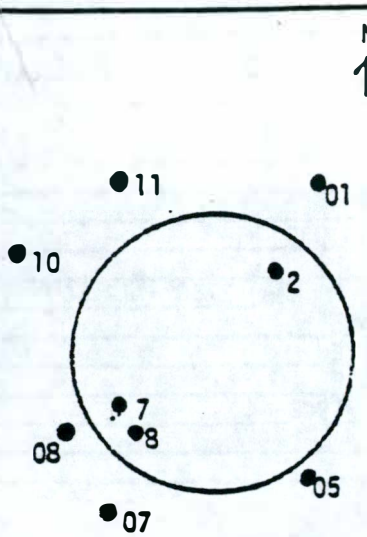
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (3)
Laterals: NO

TANK STATUS

CATEGORIZED: Stabilized (1984), Confirmed Leaker (1973)
ISOLATION: Partially (12-15-82), Interim (10-30-84)
STABILIZATION: Primary (3-78), Interim (3-01-83)
PROJECTED USAGE: NONE
SALTWELL STATUS/HISTORY: Jet saltwell pumping completed.
Installation:
Pumping Initiated: (P-10) 8-73, (Jet) 8-23-82
Completion Date: (P-10) 3-76, Jet (12-18-82)
MEAS. LEVEL (Inches): 64.60 (FIC) solids
SOLIDS LEVEL (Inches): 66.50 = 162,000 Gals (7-09-82) sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 5,000
TOTAL JET PUMPED (Gallons): 11,500
TOTAL PUMPABLE REMAINING: 0
PHOTOGRAPHS: 101094 (6-04-82), 106950 (4-06-83),

4-06-83 photographs show an uneven surface of solids and a small pool of liquid around the saltwell. The FIC plummet is contacting solids.

TANK: 102-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-02
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16"
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)*: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 6-23-46
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: No removed from Riser 7
FIC: YES (R-8) Intrusion mode
LOW: Yes (R-2) 60-02-62

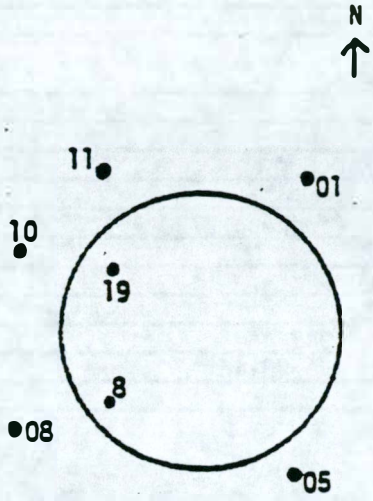
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (6)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet Saltwell Pumping Program
SALTWELL STATUS/HISTORY: NONE
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 130.70 (FIC) solids. See photo comments
SOLIDS LEVEL (Inches): 125.00 = 356,000 (4-28-82) saltcake & sludge
SUPERNATANT (Gallons): 18,000 (RE-SR-14, 10-85)
DRAINABLE INTERSTITIAL (Gallons): 126,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 122,000
PHOTOGRAPHS: 856544 (5-03-79), 88224 (10-02-79), 89031 (12-07-79), 108691 (7-26-83)
7-26-83 and 10-02-79 Photo comparisons tend to show more surface liquid and less exposed saltcake around the tank perimeter. Pieces of saltcake have fallen away from the liner and the FIC plummet appears to be contacting exposed solids.

TANK: 103-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-03
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 2-28-47
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-8))
LOW: Yes (R-19) 60-03-70

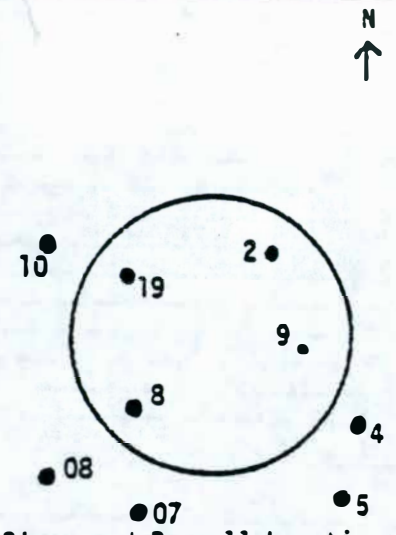
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY: NONE
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 165.80 (FIC) see photo comments
SOLIDS LEVEL (Inches): 161.0 = 455,000 (4-28-82) saltcake & sludge
SUPERNATANT (Gallons): 11,000 (RE-SR-14, 10-85)
DRAINABLE INTERSTITIAL (Gallons): 176,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 165,000
PHOTOGRAPHS: 7803299 (3-28-78), 86545 (5-03-79) 98197 (10-01-81), 8406649 (9-28-84),
10-01-81 & 09-28-84 photographs show more surface liquid than previous photos with a large area of exposed saltcake floating on the surface. The FIC plummet is contacting liquid.

TANK: 105-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-05
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 +12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 12-15-47
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO (9) Manual tape removed.
FIC: YES (R-8)
LOW: Yes (R-19) 60-05-70

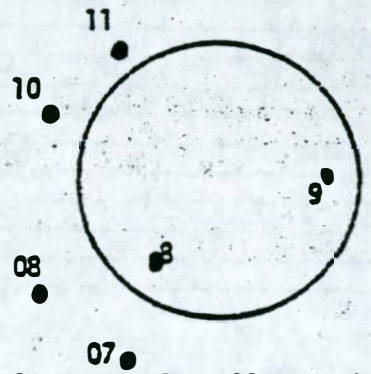
Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation: (P-10) 1-78
Pumping Initiated:
Completion Date: (P-10) 4-78
MEAS. LEVEL (Inches): 147.50 (FIC) see photo comments
SOLIDS LEVEL (Inches): 134.00 = 381,000 Gals (9-30-78) saltcake and sludge
SUPERNATANT (Gallons): 37,000 (RE-SR-14, 10-85)
DRAINABLE INTERSTITIAL (Gallons): 142,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 157,000
PHOTOGRAPHS: 7803518 (4-03-78), 7809650 (8-29-78) 95210 (3-12-81)
3-12-81 photographs show a surface of liquid and exposed saltcake with more surface liquid than previous photographs. The manual tape plummet is contacting liquid and the FIC plummet is contacting solids. The manual tape was removed 8-19-85.

TANK: 106-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-06
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 05-28-48
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-8)
LOW: Yes (R-9) 60-06-63

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

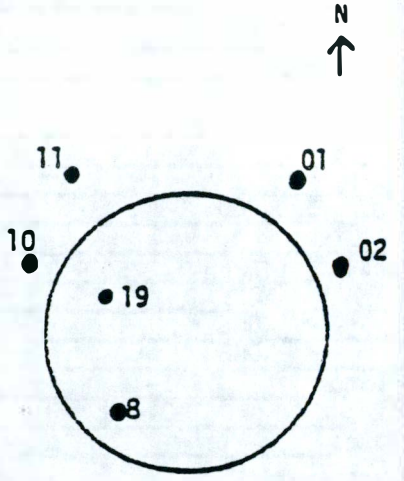
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES 4
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY: NONE
Installation:
Pumping Initiated:
Completion Date:
LIQUID LEVEL (Inches): 77.60 (FIC) see photo comments
SOLIDS LEVEL (Inches): 72.20 = 211,000 Gals (5-01-80) Saltcake and sludge
SUPERNATANT (Gallons): 15,000
DRAINABLE INTERSTITIAL (Gallons): 68,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 61,000
PHOTOGRAPHS: 775260 (6-15-77), 91002 (5-01-80), 108862 (7-29-83).

7/29/83 Photographs reveal a liquid surface free of solids with a thin film visible in some areas. The FIC plummet is not visible because of haze, but would be contacting liquid.

TANK: 107-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-07
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 9-27-48
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-8)
LOW: Yes (19) 60-07-70

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

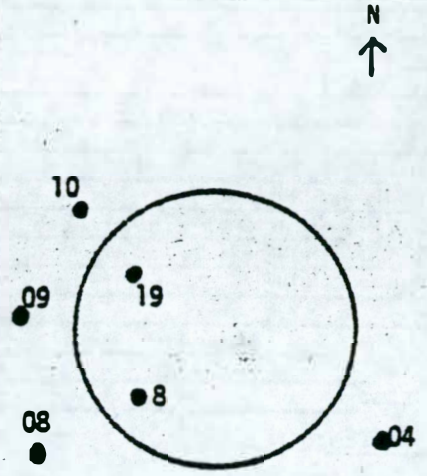
Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES 4
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation:
Pumping Initiated:
Completion Date:
LIQUID LEVEL (Inches): 142.70 (FIC) see photo comments
SOLIDS LEVEL (Inches): 131.80 = 375,000 Gals.(11-17-80) Saltcake and sludge
SUPERNATANT (Gallons): 30,000
DRAINABLE INTERSTITIAL (Gallons): 147,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 155,000
PHOTOGRAPHS: 84241 (12-07-78), 93208 (10-15-80), 102315 (6-24-82).
6-24-82 photographs reveal a liquid surface with patches of floating scum-like material over much of the surface area. The FIC plummet is contacting a clear liquid surface.

RHO-CD-213
60-08-01

TANK: 108-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-08
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 1-04-49
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-8) Intrusion mode
LOW: Yes (19) 60-08-70

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (4)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82).
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY:
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 165.90 (FIC) solids. (see photo comments)
SOLIDS LEVEL (Inches): 157.00 = 444,000 Gals. (8-20-79) Saltcake and sludge
SUPERNATANT (Gallons): 24,000 (RE-SR-14, 10-85)
DRAINABLE INTERSTITIAL (Gallons): 172,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 174,000
PHOTOGRAPHS: 776813 (8-03-77), 87583 (7-31-79), 8406173 (9-12-84)

9-12-84 photographs show what appears to be floating saltcake, with large areas of liquid visible. The instrusion mode FIC plummet appears to be suspended over solids, but is not readily visible.

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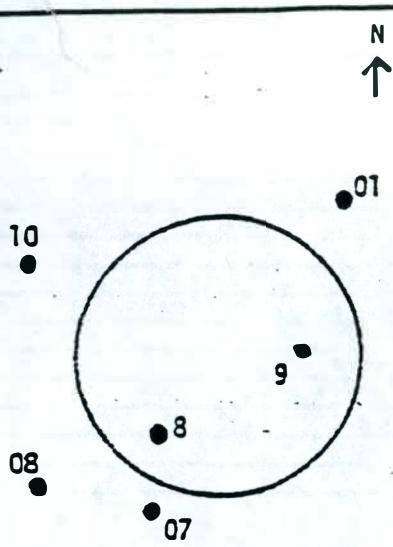
TANK: 109-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-09
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 3-16-49
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-8)
LOW: Yes (R-9) 60-09-63

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (4)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY: NONE
Installation:
Pumping Initiated:
Completion Date:
LIQUID LEVEL (Inches): 164.30 (FIC) see photo comments
SOLIDS LEVEL (Inches): 157.00 = 444,000 Gals. (11-13-77) Saltcake and sludge
SUPERNATANT (Gallons): 19,000 (RE-SR-14, 10-85)
DRAINABLE INTERSTITIAL (Gallons): 163,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 160,000
PHOTOGRAPHS: 769049 (9-27-76), 778946 (9-01-77), 95209 (3-12-81), 8406172, (9-12-84); 9-12-84 photos reveal a surface of exposed saltcake and large areas of clear liquid. The FIC plummet (not visible in current photos) is contacting liquid near the outer edge of the tank in 3-12-81 photos.

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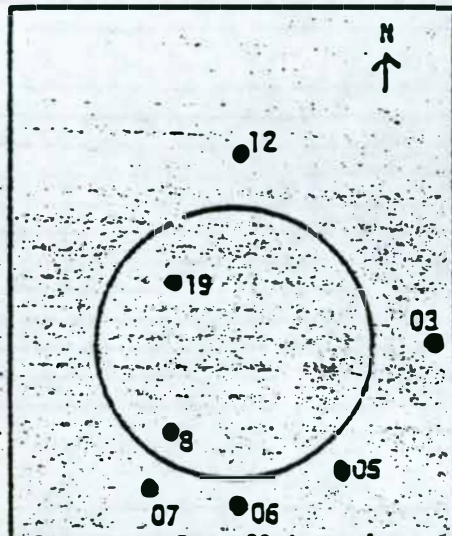
TANK: 111-U



Riser and Drywell Locations

LOCATION: 241-U
COMPUTER CODE: 60-11
TANK DESCRIPTION:
Type: Single shell
Diameter: 75'
Height: 16'
Capacity, Gals: 530,000
Bottom, Type: Dish
Volume (Gallons)=: (inches) 2750 + 12,500
Airlift Circ: NONE
Coils: NONE
Exhauster: NONE
Construction Date: 1943-44
In-Service Date: 4-47
Out-Service Date:

LEAK DETECTION SYSTEM:
Liquid Level
Manual Tape: NO
FIC: YES (R-8) Intrusion mode
LOW: Yes (R-19) 60-11-70

Annulus System
Exhaust Radiation Detector: N/A
Leak Detection (Conductivity Probes): N/A

Leak Detection Pit
Liquid Level: N/A
Specific Gravity: N/A
Radiation Detector: N/A
External Drywells: YES (5)
Laterals: NONE

TANK STATUS

CATEGORIZED: Sound/Deactivated
ISOLATION: Partially (12-15-82)
STABILIZATION:
PROJECTED USAGE: Jet saltwell pumping program
SALTWELL STATUS/HISTORY: NONE
Installation:
Pumping Initiated:
Completion Date:
MEAS. LEVEL (Inches): 114.00 (FIC) solids. (See photo comments)
SOLIDS LEVEL (Inches): 115.00 = 329,000 Gals (12/85) Saltcake and sludge
SUPERNATANT (Gallons): 0
DRAINABLE INTERSTITIAL (Gallons): 122,000
TOTAL JET PUMPED (Gallons): 0
TOTAL PUMPABLE REMAINING: 100,000
PHOTOGRAPHS: 86570 (5-17-79), 93095 (10-06-80), 100428 (2-24-82).
2-24-82 photographs show a dry cracked irregular surface that appears damp in some areas. The FIC plummet is directly over a large crack and measurement anomalies are to be expected.

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